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THE UNIVERSITY OF ALBERTA

AN ANALYSIS OF SOME FACTORS AFFECTING INNOVATION
IN ELEMENTARY SCHOOLS

by

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A THESIS

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ABSTRACT

The purpose of this study was to determine whether the differences in extent of adoption of educational innovations in elementary schools could be explained by reference to variables related to individual schools and their principals and staffs. A sample of forty schools, which generally contained at least twelve classrooms, was chosen from the ninety-six elementary schools of one school district in a city in Western Canada.

The following five partially-adopted innovations were selected: (1) departmentalization of staff in Grades 4 - 6, (2) regular use of central office consultants, (3) holding of parent-teacher interviews after early dismissal of pupils, (4) teaching of Oral French, and (5) regular use of television as an educational aid.

Data were collected by examination of school board and city records, by questionnaires, and by interviews with principals and school board officials. Two Indices of Innovativeness were developed, one being equal to the number of innovations adopted, and the other based on the extent to which these innovations were adopted. Statistical analysis was performed using product-moment correlations, t-tests, and multiple regression analysis, with nineteen independent variables.

Whereas previous studies have concentrated on cost per pupil (Mort), and characteristics of the superintendent (Carlson), as the most important factors in the adoption of educational innovations, this study and the two studies conducted in association with it, showed that characteristics of the school and the principal can explain some of the variation in extent

of adoption.

The extent of adoption was negatively correlated at the 0.05 level with the age of the principal, the pupil-teacher ratio, the number of years for which the principal had been a teacher in the school systems of the city, the number of years for which the principal had been a principal in the school systems of the city, and the number of years since the principal had undertaken formal tertiary education. No variables were significantly related to the number of innovations adopted.

However, correlations approaching the 0.05 level of significance were obtained between the number of innovations adopted and, the socio-economic status of the attendance area of the school (positive), the number of teachers' association councils to which the principal belonged (positive), the age of the principal (negative), the pupil-teacher ratio (negative), and the number of years since the principal had undertaken formal tertiary education (negative). Similarly, correlations close to the 0.05 level of significance were obtained between the extent of adoption and, membership in teachers' association councils (positive), length of teaching experience of the principal (negative), and length of experience of the principal as principal of any school (negative).

The number of innovations adopted was best predicted by the pupil-teacher ratio, the socio-economic status of the attendance area of the school, and whether or not the principal appointed staff members to report on useful innovations. The extent of adoption within each school was best predicted by the recency of the principal's education, the principal's major area of teaching interest, and the pupil-teacher ratio.

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

Educational systems can be considered as continually under pressure from forces urging change. Pellegrin categorizes these forces as external and internal. (2, p. 65) Automation, unemployment, specialized occupations, urbanization, new discoveries, and a segmented population are classified as external forces, whereas curriculum dissatisfaction and concern with the schools' contribution to the welfare of society are considered as internal.

It has been suggested that an educational revolution is in progress. (1, p. 2) In the U. S. A., at least fourteen science projects, in addition to eleven mathematics, one math-science, one English, two foreign language and six social science projects, were noted by Miles in 1964 as being national in scope. (8, p. 3) The National Education Association Project on Instruction also lends support to this suggestion. Although these developments have occurred in the U. S. A., their influence has been felt in other countries, and some of the courses, such as that of the Physical Science Study Committee, have been adopted almost in their entirety.

Hencley has expressed this change, and a result, as follows:

The increasingly open confrontation of the old with the new is bringing little tranquility to those in positions of educational leadership, and even less opportunity to cling to the anchor of the familiar. (3, p. 1)

However, many observers, for example Carlson, (2, p. 3) Mort,

(8, p. 318) and Rogers, (11, p. 39) have noted that the schools have been slow to change their practices as compared with the rates of change observed in agriculture and medicine. Most of the studies on educational innovation were performed by the staff and students at Columbia University, (12, p. 60) but these assumed that ". . . characteristics of chief school officials are unimportant in explaining rates of adoption of innovations." (2, p. 7) The recent study by Carlson dealt with the characteristics of innovating superintendents. (1, pp. 1-84) Few projects have considered the function of the principals in the innovation process.

The Problem

The purpose of this research was to determine whether significant correlations exist between innovativeness and selected variables, relevant to the principal, staff and school, in the elementary school program.

Specific statement of the problem. What is the relationship between the innovativeness shown by the elementary schools of a city school system and certain characteristics of these schools and their principals and staffs?

Sub-problems. What are the relationships between the innovativeness shown by these elementary schools and the following variables?

- (1) Personal variables of the principal--age and salary.
- (2) Academic and professional variables of the principal--amount of tertiary education, whether graduate study has been undertaken, recency of tertiary education, academic major, major field of teaching interest,

and number of memberships in teachers' association councils.

(3) Experience variables of the principal--total number of years as a teacher, total number of years as a principal, number of years as a teacher with the city school system, number of years as a principal with the city school system, and number of years as principal in his present position.

(4) Variables of the staff--mean yearly percentage turnover of staff during tenure of principal, ratio of women to men, and the presence of the practice of designating certain teachers to act as "change agents" and notify the principal of potential program changes.

(5) Variables of the school--number of pupils, pupil-teacher ratio, and socio-economic area in which the school is located.

Statement of hypotheses. Runkel has recently used a compact format for the presentation of families of hypotheses. (14, p. 18) This has been used in the technique of facet analysis devised by Guttman. (5, pp. 318-328) The following sentences use this format to incorporate most of the variables mentioned above.

(1) A principal 1, who is older, who has received more tertiary education, principal 2, younger, less
has undertaken some graduate study, has had more recent formal tertiary has not less
education, is a member of more teachers' association councils, and re-fewer
ceives a higher salary, is more likely to rank higher in innovativeness.
lower less lower

(2) A principal 1, who has had more total experience as a teacher principal 2, less

with the city school system, more experience as a principal with the city
less

school system, and has been principal of his present school for a longer
shorter

period, is more likely to rank higher in innovativeness.
less lower

(3) A school 1, in which the staff has a higher mean yearly percentage
school 2, lower

turnover, a higher ratio of women to men, and has appointed "change-agents,"
lower has not

is more likely to display a higher amount of innovativeness.
less lower

(4) A school 1, which has more pupils, a higher pupil-teacher ratio, and
school 2, fewer lower

is located in a higher socio-economic area, is more likely to display a
lower less

higher amount of innovativeness.
lower

Importance of the study. The importance of, and need for, more
research in the adoption of new educational practices in the schools is
well documented. In Rogers' words:

I would argue that in conjunction with research to develop educational innovations, we need study of how these new ideas spread and are adopted. Our past research in educational diffusion has been rather unimaginative, and has been the almost sole property of one university [Columbia]. Few studies have been completed with teachers (only one such study was encountered in a search of the literature) as the unit of adoption, and only one study of school superintendents, in spite of their importance in school adoption decisions. (3, p. 60)

This view is reinforced by that of Pellegrin.

There remain serious and complex problems concerning the nature of the changes that should be introduced, the method and timing of their introduction, and so on. In order to cope with such problems, we need much reliable knowledge we do not presently have. (2, p. 65)

Ingram feels that it is widely accepted that our schools are major social institutions, and because of this:

. . . the school must change its philosophy, structure, and procedures to meet the needs of an everchanging society, and that the schools must constantly seek for better ways to meet these needs. It must be remembered, however, that we do not change our ways merely for the sake of change itself. (6, p. 138)

The relationship between curriculum and program development, and the professional responsibility in this development are discussed by Neal.

While I agree that there is too much structural restriction in some respects, schools at present have greater freedom than they are using. Admittedly curriculum outlines are prescribed but even in this matter there is some freedom to develop alternatives. Of greater importance, however, is the fact that the curriculum is only one component of a program and schools have sole responsibility for the other components and processes which in some ways are of greater importance in producing a good program. The kind of restriction on the school's freedom which I will accept is that dictated by sound professional knowledge. (10, p. 8)

Neal also considers that ". . . undue caution in making appropriate changes, particularly in formal organization, may inhibit and defeat other worthwhile developments which are taking place," and that when teachers and schools are unduly restricted, "the desire to experiment and innovate, essential to an ongoing educational system, is seldom evident." (9, p. 34) He raises another aspect of this issue in the following statement.

Certainly one must pause and wonder why Canadian and Australian educators are not noted for innovation and experimentation, and correspondingly why change and vitality appear more frequently in United States schools. (9, p. 34)

It was hoped that this study would, by concentrating on the principal, school and staff in a Canadian setting, add a needed dimension to

research into innovation in education, and would help to provide answers to some of the questions and problems raised earlier. For example, it was expected that it may help to clarify why some schools are more innovative than others, and why the processes of change occur comparatively slowly in education. It may also be of value to be able to identify the characteristics of innovative schools, so that school systems may be guided when attempted to choose schools in which innovations can be introduced and evaluated.

Definitions of Terms Used

An innovation. This term is used throughout this study in the sense in which it is used by Graham, that is, a new practice whose acceptance can easily be discovered, and which has been introduced sufficiently recently for a considerable proportion of the population to be still in the process of adopting it. (4, p. 92) An innovation should be available for adoption by all members of the population: these members should ultimately control its adoption or rejection. In this study, the population consisted of all the elementary schools of the city school system.

Miles elaborates by stating that "generally speaking, it seems useful to define an innovation as a deliberate, novel, specific change, which is thought to be more efficacious in accomplishing the goals of a system." (8, p. 14)

Innovativeness. The innovativeness of a school or a principal is used to refer to the number of innovations adopted by that school or

principal, as compared with the number adopted by other schools or principals: it is also used in this study to refer to the relative extent to which innovations are adopted within each school.

Adaptability. Ross defines adaptability as ". . . the capacity of a school system to take on newer and more appropriate educational practices." (13, p. 175) This can obviously be applied equally well to an individual school.

Adoption process. "The adoption process is the mental process through which an individual passes from first hearing about an innovation to final adoption." (11, p. 17) Rogers lists awareness, interest, evaluation, trial and adoption, as the five stages in the adoption process.

Diffusion. Diffusion refers to the spread of an innovation from its source to its adopters or rejectors. Rogers identifies four elements in the diffusion of innovations--the innovation, its communication, a social system, and time. (11, p. 13) Katz, Levin and Hamilton define diffusion as:

(1) the acceptance, (2) over time, (3) of some specific item--an idea or practice, (4) by individuals, groups or other adopting units, linked (5) to specific channels of communication, (6) to a social structure, and (7) to a given system of values, or culture. (7, p. 2)

Organization of the Thesis

The remainder of the thesis has been organized in the following way. Chapter II contains a review of the relevant innovation literature and the statement of consequent hypotheses and problems. The research

procedures, instruments, samples, and limitations and assumptions of the study are included in Chapter III, along with a discussion of the five innovations selected. The characteristics of the schools, principals and staffs in the sample are discussed in Chapter IV.

Chapter V consists of a description of the development of the two Indices of Innovativeness. The relationships between these Indices and a number of independent variables, and a description of the methods used to obtain these relationships, occur in Chapter VI. A summary of the investigation and its findings, as well as suggestions for future research into adoption of educational innovations, concludes the thesis.

Summary of Chapter I

Educational systems, although under pressure from many forces advocating change, are relatively slow to alter existing practices as compared with fields such as agriculture and medicine. Previous studies have largely ignored the roles of the individual schools and principals in the process of change. However, the literature has stressed the need for more detailed investigation of the ways in which educational innovations are spread.

The problem in this study was to investigate the relationship between the innovativeness of the elementary schools of a city school system, and selected variables of the schools, principals and staffs.

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CHAPTER II

REVIEW OF THE LITERATURE

The Processes of Change

The six major diffusion traditions are listed by Rogers as anthropology, early sociology, rural sociology, education, industry, and medical sociology. (17, p. 23) Gallaher points out that anthropologists consider that culture is bound to change and that the various parts of a culture are interconnected. (3, p. 38) Changes can occur from within through invention or discovery, but research has been concentrated on the more common cause of contact between groups resulting in diffusion, or in acculturation, i.e., changes within a group because of contact with another group.¹

Studies at Columbia University have shown that six focal points, called "determiners," influence curriculum change. These are teachers, students, subject matter, methods, materials and facilities, and time. (14, p. 402)

Carlson assumes that:

. . . the rate of acceptance of a new practice or idea by individuals or adopting groups depends on (1) the characteristics of the adopting unit (individual and/or group), (2) the way the adopting unit is joined to communication channels and sources of information, and (3) the position the adopting unit holds in the social structure of like units. (2, p. 5)

¹Because this study is not really concerned with the sociological aspects of change, discussion of the relevant change process literature is curtailed. A short description can be found in an article by Gallaher. (3, pp. 37-51)

The advocates of change frequently encounter barriers during advocacy or introduction of an innovation. Conant has recently expressed his misgivings about the "frightening 'rigidity'" of the educational "establishment"." (6, p. 251) One desirable aspect of this resistance is explained by Eichholz.

Rejection is normal, providing one of the most effective means in the long-range evaluation of change. It is only through the dual process of rejection and acceptance that change can be controlled and channelled into its most effective form. Immoderate and unthinking acceptance is as harmful as prolonged and unreasonable rejection. (9, p. 268)

Brickell, who was appointed to study educational experimentation in New York State, postulates two reasons for this phenomenon.

A school, like any other institution, tends to continue doing what it was established to do, holding itself relatively stable and resisting attempts at restructuring. There is sound reason for this: Stability in the institutional structure makes for maximum output of the results that structure was designed to produce. Any change in the arrangement of its elements tends to cut down production, at least until new habits are formed. (1, p. 19)

The most formidable block to instructional improvement today is that education--unlike medicine, agriculture and industry--fails to distinguish the three phases of change: design, evaluation, and dissemination. Moreover, it fails to support adequately the basic research which should precede the design phase. (1, p. 63)

The absence from the educational scene of the "change agents" known in agriculture and medicine is considered by Rogers to be a factor which can help to explain the relative slowness of schools in adoption of innovations. (17, p. 256) Carlson supports this view, and adds that superintendents, besides not being as well informed as agricultural county agents, are required to change their own practices when innovating. (3, pp. 4-6) He also considers that "domestication" of the public schools

(meaning that the schools cannot reject pupils, nor can the pupils reject the schools) implies that change is not essential for their survival, whereas it is for some other institutions.

Willower points out that change may be resisted if the status structure within an organization is disturbed, if one part of an organization benefits at the expense of another part, if the change is imposed from above, if either information or skill is lacking, if the early stages of innovation are exhausting, if the change is too expensive, or if pupil control is involved. (18, pp. 258-262)

Culbertson feels that there is a danger of being engulfed by change in the schools. (6, p. 251) Although this may not be the situation in education at present, maintenance of balance between the advantages of stability and innovation is desirable.

The Columbia University Studies

The first diffusion studies of the Institute of Administrative Research, Columbia University, were performed in the late 1930's. Up to 1957, 150 studies dealing with the adaptation process, influences on the adaptability of school systems, and the adapters, were completed. The fifty studies performed since 1957 generally dealt with the influences affecting the adaptability of school systems. (14, pp. 317-318)

The early studies determined that change in American schools was a very slow process. Mort, who influenced this entire research area, concluded that:

Between insight into a need . . . and the introduction of a way of meeting the need that is destined for general acceptance . . . there is typically a lapse of a half-century. Another half-century is required for the diffusion of the adaptation. (14, p. 318)

The best single predictor of acceptance of an innovation was determined to be the educational cost per pupil. (16, p. 40) Carlson feels that ". . . the studies in the Mort tradition begin and end with an assumption that level of expenditure accounts for varying adoption rates." (2, p. 9)

The West Virginia and Allegheny County Studies

In 1963-64, Carlson attempted to find an ". . . explanation of varying rates of adoption of new educational practices by school systems and superintendents, and explanation of varying rates of diffusion of educational innovations." (2, p. 2) He is of the opinion that:

The Mort studies seem to have contributed little to the understanding of the diffusion of ideas because, among other reasons, the determinant factor (financial support) was narrowly conceived. Also, the studies ignored the large general body of research on the adoption process. (2, pp. 9-10)

His impetus was obtained from the vast amount of work performed by rural and medical sociologists. Data were collected by interview from sixty-one superintendents in Allegheny County, Pennsylvania, and from forty-six superintendents in West Virginia. The data concerned their personal characteristics, habits of communication, the positions of the superintendents in the social structure of superintendents, the dates of adoption and characteristics of the selected innovations, which were modern mathematics, programmed instruction, team teaching, foreign

language laboratories, foreign language instruction in elementary grades, and accelerated programs in secondary schools. (2, p. 11)

The dependent variable, the rate of adoption, was calculated by adding the stanine scores of the separate adoption rate measures. The correlations between the rate of adoption and twenty-five independent variables were calculated.

The Allegheny County results indicate that:

. . . high rate of adoption is associated with superintendents who were promoted to their positions from outside the school system, who were highly educated, who were rated by their peers as being highly professional, who were opinion leaders, who did not exhibit conflict in their performance standards, who made accurate judgments about their rates of adoption in regard to the median rates of adoption in the county, and who had recently acquired some formal education. The directions of these correlations also indicate that high rates of adoption are associated with school systems that have comparatively high levels of expenditure per pupil, and large enrollments. (2, p. 55)

Surprisingly, ". . . 'search for new practices' had the least relationship with rates of adoption." (2, p. 55) It had, quite reasonably, been assumed that a higher rate of adoption of innovations would have resulted from the visits of superintendents to other systems.

In West Virginia, a high rate of adoption was associated at the 0.05 level with superintendents who were rated by their peers as being highly professional, who were opinion leaders, who were well known, who attended more professional meetings and contacted more people outside their own geographical areas, who held higher prestige, who held more accurate perceptions of their innovativeness as compared with other superintendents, who received more friendship choices, and had high enrollments. (2, p. 57)

Therefore, only professionalism, opinion leadership, enrollment, and accuracy of perception of innovativeness were correlated with rate of adoption at the 0.05 level in both Allegheny County and West Virginia. The mean expenditure level, considered so crucial in the Columbia University studies, was not consistently related to the number of innovations adopted, having a correlation of 0.25 in West Virginia and -0.24 in Allegheny County. (2, p. 62) Non-adopters tended to have the same characteristics as late adopters, namely to:

- (1) have less formal education, (2) receive fewer friendship choices,
- (3) know well fewer of their peers and be less well known by them,
- (4) participate in fewer professional meetings, (5) interact less often with other superintendents in their area, (6) be sought less often for advice and information, (7) receive lower ratings on the professionalism score, (8) hold less prestigious superintendencies, (9) perceive less support from their school boards, and (10) rely more on local sources for advice and information. (2, p. 64)

However, Carlson points out that this study suffered, as did other diffusion studies, from the inadequate number of cases about which generalizations could be made, and concludes that ". . . the characteristics of innovators have not been identified with a great degree of assurance." (2, p. 65)

The Role of the Superintendent in Program Change

Carlson feels that ". . . the school superintendent is at the focal point in the decision process regarding innovations," and that he ". . . is in a position to make the final decision." (2, pp. 10-11) This viewpoint is shared by Griffiths, (10, p. 284) and by Mackenzie, (14, p. 411) who, after a survey of the Columbia University studies,

concluded that "in many instances, the superintendent of schools appeared to be the most powerful single participant in change." However, Gallaher feels that administrators can rarely be forceful advocates of change because of their balancing role between the school board and the teachers. (3, p. 50)

The Role of the Principal in Program Change

There is some conflict evident in the literature concerning the importance of the principal in the innovative process. As noted above, some writers consider the superintendent to be the key figure. Culbertson comments:

Is the implementation of educational change so dependent upon administrative and supervisory teams that individual administrators do not stand out as innovators? Does the position of the principalship within the organizational hierarchy prevent the principal from assuming an aggressive role in change? Could it be that in helping others make educational changes the principal is just as ingenious as those who make the changes? (6, p. 250)

Griffiths has described a simulated administrative situation in which 232 elementary principals, selected from throughout the U. S. A., were for five days allowed to consider changes in policy, duties and personnel which they would make if they were principal of an imaginary "Whitman School." (10, pp. 278-284) However, they innovated infrequently during that time. No significant relationship was discovered between the "change score" and age, experience, or education. Griffiths concluded that "the results of this study indicate that the elementary-school principal seldom introduces a new idea into the school system," and that:

An understanding of the reason for the absence of strong personal direction rests with his place in the hierarchy of the organization--he is at least three steps from the top even in a small school district. (10, p. 283)

Some objection can possibly be taken to the external validity of such a study, particularly when the extreme artificiality of the situation is considered. Many writers do consider that the principal is of prime importance in program change.

For example, Demeter found in 1951 that:

Building principals are key figures in the process. Where they are both aware of and sympathetic to an innovation, it tends to prosper. Where they are ignorant of its existence, or apathetic if not hostile, it tends to remain outside the blood stream of the school. (7, p. 23)

In reporting on the discussion following a seminar at the University of Oregon in 1964, Miles observed that the discussion proceeded:

. . . as if the superintendent were the key--as if he were the only person in the situation and as if his way of operating an innovative role was going to be the sole determinant of the consequences. The group began backing away and pointing out that there are figures called building principals and various other figures in the system, and that working with them turns out to be very crucial. (3, p. 81)

Ingram points to the possible contribution of the staff to innovation.

It is my opinion that in a well-run school there will be just as many, if not more, good ideas for improvement coming from individual staff members or from the staff as a unit [as from administration]. The principal can operate as a "change agent" just as effectively, if not more effectively, when ideas originate from some source outside of administration. (11, p. 140)

Ziolkowski comments that "as a change agent within the school the principal may induce a climate which will enable the staff to accept, and even to initiate change." (20, p. 1) Chesler, Schmuck and Lippitt concur

with this emphasis on the importance of climate, and state that research substantiates their view that a principal, through encouragement and production of a suitable climate, can encourage innovation. (5, pp. 269-274)

The statement by MacKay that ". . . the development of the instructional program in his school can be viewed as the primary task of the principal," (13, p. 65) is in accord with the view of Cheal, who adds that "Canadian school principals have had little responsibility, and hence little influence, on the development of the school's curricula," and that "within the broad outlines of existing programs and courses there is ample latitude for the principal and his staff to work towards improved programs leading to more effective teaching and learning." (4, p. 60)

Purvis sees the principal as enjoying ". . . an opportunity for bringing about change which is not duplicated by any other individual in the education system." (15, p. 73) The adoption of innovations is noted by Downey to be one of the characteristics of a "statesman-like school leader" who ". . . will, indeed, see to it that new ideas find their way into his school," and "in effect he will become his own 'change agent'." (8, p. 135) Eichholz suggests that principals are able to take steps to overcome the cause of teachers' rejection of innovation, once the principals are aware of the cause of rejection. (9, p. 267)

Four major trends in the elementary school curriculum are discussed by Worth--reselection of content in traditional subjects, introduction of new subjects, earlier grade placement of subject matter, and individualization of instruction. (19, p. 10) In saying that these had

obvious implications for the principal in the fields of in-service training, effective program coordination, equipment, staff utilization patterns, and new forms of school organization, Worth focuses attention directly on the importance of the principal in introducing innovations, and appears to sum up effectively why studies in this area are of considerable, and possibly even vital, importance.

Hypotheses

This study was to a considerable extent exploratory. Research and learned opinion suggested a positive correlation between only a few of the variables mentioned in Chapter I and innovativeness. Hypotheses 1, 2 and 3 were based on Carlson's findings in Allegheny County, (2, p. 55) assuming that the position of the principal with regard to the introduction of innovations in his school, is analogous to that of the superintendent introducing innovations into his system. It was, however, realized that the extent and types of innovations introduced by a superintendent, or other members of a central office staff, can differ considerably from those introduced by a principal.

Hypothesis 1. "Elementary school principals who have completed more years of formal tertiary education tend to be more innovative than elementary school principals who have completed fewer years of formal tertiary education."

Null Hypothesis 1. "There is no significant correlation between the value of an Index of Innovativeness and the number of years of

formal tertiary education completed by an elementary school principal."

Alternative Hypothesis 1. "A significant positive correlation exists between the value of an Index of Innovativeness and the number of years of formal tertiary education completed by an elementary school principal."

Hypothesis 2. "Elementary school principals who have completed some graduate study tend to be more innovative than elementary school principals who have not completed any graduate study."

Null Hypothesis 2. "There is no significant difference between the mean value of an Index of Innovativeness for the principals who have completed some graduate study, and the mean value of this Index of Innovativeness for the principals who have not completed any graduate study."

Alternative Hypothesis 2. "The mean value of an Index of Innovativeness for the principals who have completed some graduate study will be significantly higher than the mean value of this Index of Innovativeness for the principals who have not completed any graduate study."

Hypothesis 3. "Elementary school principals who have completed formal tertiary education more recently tend to be more innovative than elementary school principals who have completed formal tertiary education less recently."

Null Hypothesis 3. "There is no significant correlation between

the value of an Index of Innovativeness and the number of years which have elapsed since the principal completed formal tertiary education."

Alternative Hypothesis 3. "A significant negative correlation exists between the value of an Index of Innovativeness and the number of years which have elapsed since the principal completed formal tertiary education."

Ingram points to the teaching staff as a source of innovations, (11, p. 140) and as mentioned above, Demeter has reported on the necessity of principals being both aware of and sympathetic towards innovations, if the innovations are to prosper. (7, p. 23) In view of these findings, and the statements by Carlson (3, pp. 4-6) and Rogers (17, p. 256) that the absence of change agents in education may be a factor retarding innovation in the schools, the following hypothesis was formulated.

Hypothesis 4. "Elementary schools in which at least one teacher is officially designated to bring the attention of the principal to useful innovations will tend to be more innovative than elementary schools in which such a teacher is not appointed."

Null Hypothesis 4. "There is no significant difference between the mean value of an Index of Innovativeness for the schools which have at least one teacher officially appointed to bring the attention of the principal to useful innovations, and the mean value of this Index of

Innovativeness for the schools in which no teacher is officially appointed for this purpose."

Alternative Hypothesis 4. "The mean value of an Index of Innovativeness for the schools which have at least one teacher officially appointed to bring the attention of the principal to useful innovations, is significantly higher than the mean value of this Index of Innovativeness for the schools in which no teacher is officially appointed for this purpose."

Rogers states that "outstandingly innovative school systems are usually located in particularly wealthy communities," (17, p. 255) but points out that not all rich schools are innovative, and not all innovating schools are rich. The characteristics of the communities in which adaptable schools are located are listed by Kumpf.

An adaptable school tends to be located in a community which has many people in the white-collar or professional occupations, has a high cultural level, has a high percentage of owner-occupied dwellings . . . and tends to be high in per capita wealth A fairly high median [educational level] has been attained by those who are 25 years of age and older in the community. (12, pp. 13-15)

It is recognized that a difference exists between a comparatively wealthy school district and a comparatively wealthy attendance area for a school within a school district, and the possibility exists that the characteristics listed by Kumpf are concomitants of high per capita wealth. However, in view of the above statements, the following hypothesis was suggested.

Hypothesis 5. "Elementary schools which are located in higher socio-economic attendance areas tend to be more innovative than elementary schools which are located in lower socio-economic attendance areas."

Null Hypothesis 5. "There is no significant correlation between the value of an Index of Innovativeness and the socio-economic rating of an elementary school attendance area."

Alternative Hypothesis 5. "A significant positive correlation exists between the value of an Index of Innovativeness and the socio-economic rating of an elementary school attendance area."

A positive correlation between innovativeness and the number of teachers' association councils to which the principal belonged, could be anticipated, if such membership is classed as a measure of "professionalism" or "cosmopolitanism" found by Carlson to be relevant.

Relationships between the innovativeness shown by a school and the following characteristics did not seem to be supported by research, reported experience or learned opinion. This study then, besides investigating the above hypotheses, was an endeavor to determine whether such relationships did exist.

1. principal--academic major, major field of teaching interest, age, salary, number of years of teaching experience, number of years of teaching experience with the city school system, number of years as principal of his present school, number of years as a principal with the city school system, and total number of years as a principal.

2. teaching staff--ratio of women to men, and annual percentage turnover of staff (as perceived by the principal).

3. school--number of pupils, and pupil-teacher ratio.

The hypotheses and associated problems were tested for significance at the 0.05 and 0.01 levels. If a correlation coefficient or t value was not significant at the 0.05 level, then the particular hypothesis was rejected.

Summary of Chapter II

Educational systems are known to offer considerable resistance to change, but this resistance does produce stability leading to maximum output. The absence from the educational scene of the "change agents" known in other fields, and the fact that change does not seem to be necessary for survival of the schools, may partially explain this rigidity.

The "determiners" of curriculum change were shown by Columbia University studies to be teachers, students, subject matter, methods, materials and facilities, and time, with educational cost per pupil being the best single predictor of adoption of innovations.

Carlson found that the rate of adoption of innovations depended in part upon the social involvement of superintendents. The view that the superintendent is a focal figure in adoption is supported by other authorities. However, Culbertson and others feel that the importance of the principal in adoption of innovations has been overlooked.

Five hypotheses, based on research findings, were formulated, linking innovativeness with the level of education of the principal, whether or not the principal had undertaken graduate study, the recency of the principal's education, whether or not the principal appoints teachers to report on useful innovations, and with the socio-economic rating of the attendance area of the school. The relationships between innovativeness and certain other variables not specifically mentioned in the literature, were considered as problems to be investigated in association with the testing of the hypotheses.

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CHAPTER III

RESEARCH PROCEDURES

Samples for Main Study and Pilot Study

Because practices which would be classified as innovations in the elementary schools are not necessarily innovations in secondary schools, it was decided to restrict the population under study to elementary schools within one city school system. This procedure produced a sufficiently large and uniform population, and reduced the number of complicating factors. The small number of secondary schools which existed within the city system precluded the possibility of an investigation at the secondary level.

The criteria for inclusion of the elementary schools in the sample were as follows.

(1) The school must contain at least twelve elementary classrooms.

This ensured that the principal, under the regulations of the school board, had at least 70 per cent of his time free from classroom teaching, and could therefore be categorized as an administrator rather than a teacher.

(2) The principal must be in at least his second consecutive year of office in that school.

This requirement meant that the principal had occupied his position for a length of time sufficient to allow him to be considered as

having an influence on the adoption of innovations.

(3) The number of junior high school classrooms was not to exceed 20 per cent of the total number of classrooms.

This percentage, which was arbitrarily selected, ensured that the schools would be essentially elementary in character.

These criteria were intended as initial guidelines. However, in order to obtain the widest possible range of socio-economic status of the attendance area of the schools, three schools which varied from the above criteria were included. Two of these schools contained slightly fewer than twelve classrooms, and two had higher ratios of junior high school classrooms. Inclusion of these three schools produced a sample of forty-two schools from a population of ninety-four schools containing elementary classrooms.

Pre-testing of the instruments was performed by using the three demonstration schools of the city school system, because it was anticipated that the principals of these schools, which were excluded from the sample, would be aware of current innovations. Minor alterations in the instruments were made following these three interviews.

Limitations and Assumptions of this Study

This study was essentially exploratory, and, by concentrating on the individual schools and principals, used an approach which appeared to be new in the field of research into the adoption of educational innovations. The basic assumption was that principals have considerable freedom with regard to making changes in the program of

their schools. Discussions with school officials showed that all principals had equal freedom in this regard, although the general practice was for the principals to first seek the approval of central office staff, or at least to discuss the proposed change before initiating it.

Another assumption was that although the suggestions for program changes may come from a variety of sources, such as teachers, the literature and the community, a change would not be introduced unless it had the approval of the principal. Continued use by a principal of an innovation introduced by his predecessor was taken as indicating the present principal's approval of the practice. Therefore continuation of an existing practice was taken to be equivalent to beginning a new practice, although the latter action may generally be more difficult.

It was postulated that a meaningful and discriminating Index, or Indices, of Innovativeness could be developed from the obtained data. Accurate recall, knowledge and judgments by principals were assumed. The instruments were assumed to possess a degree of validity and reliability suitable for the present study, and to produce responses which were amenable to the applied statistical procedures.

Methods of Collecting Data

Two other studies were conducted in conjunction with this research. These investigated the relationships between innovativeness and variables such as the cognitive styles, personality factors, and social system involvement of the principals. The data were collected concurrently, because the same information was required, in some cases,

for the three studies.

Three methods were used to collect the data.

(1) Some information concerning items such as education, experience and salaries of principals, and socio-economic ratings of school attendance areas was obtained from records and personnel at the school board (Appendix A), and city offices.

(2) The forty-two principals of the schools in the sample were convened to a meeting in March, 1966, by the Assistant Superintendent of the Department of Elementary Education of the city school system. At this meeting, the purposes and methods of this study were explained, and Questionnaires A and B (Appendix B) were completed. Following this meeting, one principal withdrew from the study, and one was too ill to participate, so the final sample was reduced to forty schools.

(3) Interviews were conducted during March, 1966, with the principals at the schools in order to obtain detailed information on the selected innovations and other matters listed in the Interview Schedule in Appendix C. The interviews varied in length from forty-five minutes to two hours, and generally occupied approximately one hour.

Instruments

Certain factual information was not readily available from the school board records, and in order to obtain this information, questionnaires were submitted to, and interviews conducted with, principals and central office administrative personnel. The instruments used in the study are included in the Appendix. These instruments contain questions

related to this study and the two companion studies, and were constructed jointly by the three researchers.

An estimate of the socio-economic level of the attendance area of each school was obtained by combining the following three separate assessments¹--the average house value, and the two socio-economic ratings given by a school planner and a city planner. It was realized that such ratings were subjective and approximate, but more accurate ratings, based for example on per capita income, did not seem to be available. Even if income measures had been available, they possibly would not have been more meaningful.

The study was complicated by the amalgamations of two outer suburban school districts with the city school district which occurred in 1962 and 1964. Some of the questions were structured to determine the teaching and administrative experience of the principals in the suburban districts, but this was considered as experience with the city school district for the purpose of this study, because of the high degree of geographical and social unity of the three administrative districts before amalgamation.

The interviews were also used to collect information about five innovations. Following preliminary discussions with central office officials and University of Alberta staff, a decision was made to use (1) departmentalization, (2) regular use of central office consultants, (3) interviews with parents, (4) French instruction, and (5) regular

¹A description of the method used occurs on pages 36 and 38.

use of television as an educational aid, as the innovations whose adoption or non-adoption would, it was hoped, actually distinguish among the innovativeness of the schools in the sample.

Operational definitions of the five innovations were as follows.

(1) Departmentalization: one teacher teaches the same subject to more than one class in Grades 4 - 6. For example, one teacher teaches mathematics to both Grade IV classes, or to both a Grade IV and a Grade V class. This was considered to be innovative because the traditional elementary school procedure has been for the same teacher to teach all subjects to the one class. It was assumed that the approval of the principal was required for the institution or continuance of a departmentalized arrangement.

(2) Regular use of central office consultants: this meant regular requests by the principal for help for teachers from the central office consultants. The usual approach had been for the elementary school principal to provide such help for his staff, and the regular requesting of outside assistance, beyond that provided as a matter of policy by the consultants, was therefore thought to be an innovative procedure. Because the need of each school for consultative help is unique, the number of visits made in one year to each school is not necessarily a measure of the innovativeness of the principal. The question of extent of use was therefore designed to incorporate the necessity for such help in the particular school.

(3) Interviews with parents: time is provided by the principal

for teacher-parent interviews to occur regularly during the time when the teachers would normally be in class, by dismissing the pupils earlier than is usual. The most common practice had been to hold these interviews outside regular class hours.

(4) French instruction: this is commonly called "Oral French," and can occur in Grades V and VI. Only in recent years has French been taught in elementary schools in this school system--it could therefore legitimately be considered as a new practice for the schools in the sample. It was assumed that the decision to offer French was a matter for the principal, and this was borne out during the interviews.

(5) Regular use of television as an educational aid: regular viewing of the Canadian Broadcasting Corporation morning telecasts, or other programs considered to be educational. Although the use of television in schools was not a new practice, it was thought that the regularity of use of the set or sets provided in each school would help to discriminate between the innovativeness of the schools. It was expected that the principal is involved in decisions concerning the use of the set or sets because of the possibility of grouping classes or the need to decide which classes will view particular programs.

The opinions of three senior central office officials concerning the innovativeness of the schools in the sample were obtained in the hope that these opinions would tend to confirm the values gained for each Index of Innovativeness.

Summary of Chapter III

A preliminary sample of forty-two elementary schools was selected from ninety-four elementary schools in the city school system. The schools in the sample generally contained at least twelve elementary classrooms, and had principals who could devote at least 70 per cent of their time to administration. The final sample consisted of forty elementary schools.

It was assumed that the principals had considerable freedom to introduce new practices and that the innovations used in this study would not be introduced into a school unless they had the approval of the principal.

Five new practices were selected in an attempt to distinguish between the innovativeness of the schools. These were, departmentalization of staff, regular use of central office consultants, parent-teacher interviews after early dismissal of pupils, the teaching of French, and the regular use of television as an educational aid.

The data were collected by examination of central office and city records, and by the use of questionnaires and interviews. It was assumed that these instruments produced valid responses, and that meaningful Indices of Innovativeness, based on the five innovations, could be developed.

CHAPTER IV

DESCRIPTION OF THE SCHOOLS IN THE SAMPLE

As was mentioned in Chapter III, the majority of the forty schools in the sample contained at least twelve elementary classrooms, and if junior high school classrooms were present, the number of such classrooms generally did not exceed 20 per cent of the total number of classrooms. In addition, the principals were all in at least their second consecutive year of office in their present schools.

Further information about the schools, the principals and staffs, is listed in Tables I through XI. In order to simplify presentation and to make the distributions more meaningful, the data generally were grouped using up to nine categories.

Variables of the Schools

The pupil populations ranged from 284 to 827 with a mean of 504, and were approximately normally distributed, but the distribution was positively skewed as is seen in Table I. The pupil-teacher ratio, also shown in Table I, ranged from 20.96 to 31.00, had a mean of 26.77, and showed a slightly negatively skewed distribution.

The range of the mean values of houses sold in the attendance area of each school since 1963 was \$9,189 to \$24,439. These values were obtained by placing an overlay of the school attendance areas upon a map of the city assessment areas, and proportioning the average house values where the boundaries were not coterminous. Factors such as new housing

TABLE I

FREQUENCY DISTRIBUTIONS OF NUMBERS OF PUPILS IN GRADES 1 - 6 AND
PUPIL-TEACHER RATIOS FOR SCHOOLS IN SAMPLE^a
(N = 40)

Category	PUPIL POPULATION			PUPIL-TEACHER RATIO		
	Range	Frequency	Percentage frequency	Range	Frequency	Percentage frequency
9	755 and higher	2	5.0	29.50 and higher	2	5.0
8	690 - 754	3	7.5	28.50 - 29.49	4	10.0
7	625 - 689	4	10.0	27.50 - 28.49	9	22.5
6	560 - 624	6	15.0	26.50 - 27.49	9	22.5
5	495 - 559	5	12.5	25.50 - 26.49	7	17.5
4	430 - 494	4	10.0	24.50 - 25.49	4	10.0
3	365 - 429	8	20.0	23.50 - 24.49	1	2.5
2	300 - 364	7	17.5	22.50 - 23.49	1	2.5
1	299 and lower	1	2.5	22.49 and lower	3	7.5
Mean			504	26.77		
Standard deviation			142	1.99		

^aThe information in this table was obtained from central office records.

developments may have affected the mean value of houses in some of the attendance areas. The ranges in Table II were chosen to produce a close-to-normal distribution in nine categories of the house values. This distribution was obtained by using the following technique, which is described by DuBois. (1, pp. 298-300) The C scale partitioning percentiles of 1.22, 4.01, 10.56, 22.67, 40.13, 59.87, 77.34, 89.44, 95.99 and 98.78, are used to produce an eleven-category distribution. The two extreme categories are combined to produce a nine-category distribution which allows ease of handling of the data. An approximately normal frequency distribution of 2-2-5-7-8-7-5-2-2 was obtained when this technique was used for a sample of forty schools.

A more leptokurtic distribution was obtained in the assessments of the socio-economic status of the school attendance areas given by a school planning officer: the distribution of the assessments given by a planning officer of the city, (Table II), was less leptokurtic than that of the school board officer, and was slightly negatively skewed. These two officers were asked to place the forty schools into nine categories, but no restriction on the number of schools which was to be placed in each category was mentioned--this was left to the discretion of each officer.

In order to produce an overall socio-economic index of each school attendance area, the assessments for each area were added and the sums forced into the approximately normal distribution of 2-2-4-7-10-8-3-2-2, which was the closest fit to the 2-2-5-7-8-7-5-2-2 distribution. Although this procedure assumed that the socio-economic

TABLE II

FREQUENCY DISTRIBUTION OF SOCIO-ECONOMIC STATUS OF ATTENDANCE AREAS OF SCHOOLS
IN SAMPLE, BASED ON HOUSE VALUES AND ASSESSMENTS BY PLANNERS
(N = 40)

Socio-economic category of attendance areas	NORMALIZED HOUSE VALUE ^a	SCHOOL		CITY		Total of three assessments	Percentage frequency	SOCIO-ECONOMIC INDEX ^b
		PLANNER ASSESSMENT	PLANNER ASSESSMENT	PLANNER ASSESSMENT	Frequency			
9 (highest)	\$20,000 and higher	2	1	1	1	24-27	2	5.0
8	18,000 - 19,999	2	1	1	1	20-23	2	5.0
7	16,000 - 17,999	5	2	2	1	18-19	3	7.5
6	14,600 - 15,999	7	9	8	1	16-17	8	20.0
5	13,000 - 14,599	8	9	7	1	13-15	10	25.0
4	11,300 - 12,999	7	8	6	1	10-12	7	17.5
3	10,500 - 11,299	5	5	9	1	8-9	4	10.0
2	10,260 - 10,499	2	4	5	1	7	2	5.0
1 (lowest)	10,259 and lower	2	1	1	1	6	2	5.0

^aThese values were based on information obtained from records at the city offices.

^bA description of the method used to calculate this index occurs on pages 36 and 38.

^cThe ranges were chosen so as to produce a close-to-normal distribution.

assessments could be treated as scores, this was considered to be justified in view of the subjective nature of the socio-economic status assigned to a residential area. The correlation coefficients obtained between the individual and combined socio-economic assessments were all significant at the 0.005 level, (Table III).

Variables of the Principals

The variables related to the principals fall into three fairly distinct groups, dealing with personal, academic and professional, and experience factors.

Personal variables of the principals. All forty principals of the schools in the sample were male, with ages distributed in an approximately normal manner from 34 to 63 years, (Table IV): the mean of this negatively skewed distribution was 51.2 years on September 1, 1965. The salary distribution was also negatively skewed with a mean of \$11,715.

Academic and professional variables of the principals. Of the forty principals involved in the study, nineteen had undertaken some graduate study; fifteen had studied natural science or mathematics, as compared with social sciences or humanities, as a major subject at university; and twenty-two were more interested in teaching science or mathematics than in teaching other subjects. Four principals were members of two teachers' association councils, twenty belonged to one council, and sixteen were not members of any of these councils.

TABLE III

INTERCORRELATION MATRIX OF VARIOUS ASSESSMENTS OF
 SOCIO-ECONOMIC STATUS OF ATTENDANCE
 AREAS OF SCHOOLS IN SAMPLE
 (N = 40)

Socio-economic assessment	1	2	3	4
1. House value	1.000	0.760	0.595	0.856
2. School planner		1.000	0.671	0.894
3. City planner			1.000	0.840
4. Combined				1.000

All values were significant at the 0.005 level.

TABLE IV

FREQUENCY DISTRIBUTIONS OF AGES AND SALARIES OF PRINCIPALS OF SCHOOLS IN SAMPLE^a
(N = 40)

Category	AGE			SALARY		
	Range (years)	Frequency	Percentage frequency	Range	Frequency	Percentage frequency
9	--	--	--	\$12,600 and higher	3	7.5
8	62 - 65	2	5.0	12,300 - 12,599	8	20.0
7	58 - 61	6	15.0	12,000 - 12,299	9	22.5
6	54 - 57	8	20.0	11,700 - 11,999	2	5.0
5	50 - 53	10	25.0	11,400 - 11,699	5	12.5
4	46 - 49	5	12.5	11,100 - 11,399	2	5.0
3	42 - 45	5	12.5	10,800 - 11,099	4	10.0
2	38 - 41	2	5.0	10,500 - 10,799	4	10.0
1	34 - 37	2	5.0	10,499 and lower	3	7.5
Mean	51.2 years			\$11,715		
Standard deviation	7.1 years			\$ 747		

^aThe information in this table was obtained from central office records.

By using the division of qualifications shown in Table V, an approximately normal distribution of the level of university education was obtained. The qualifications within each category were considered to be approximately equivalent to each other. Four principals had achieved a level beyond the Master of Education degree, and eleven had either two bachelors degrees and one year of graduate study, or a Master of Education degree. Ten had attained the level of two bachelors degrees, or a Bachelor of Education degree and at least one year of graduate study. The Bachelor of Education degree was the sole qualification held by thirteen principals: two had not achieved this level.

Table VI shows that the use of the number of years of university education as assessed by the Faculty of Education of the University of Alberta was not as discriminatory as the criteria described above because of the extreme negative skewness of the distribution. The categories of the number of years of university education from one to six contained one, one, zero, nine, eight and twenty-one principals respectively.

Examination of the frequency distribution in Table VII of the number of years which had elapsed since the principals had undertaken formal tertiary education, showed that it was positively skewed, with thirty principals having studied formally in the previous nine years. The mean time which had elapsed since formal tertiary education was 6.71 years.

TABLE V

FREQUENCY DISTRIBUTION OF LEVEL OF UNIVERSITY EDUCATION ACHIEVED BY
 PRINCIPALS OF SCHOOLS IN SAMPLE^a
 (N = 40)

Category	Qualifications	Frequency	Percentage
5	Graduate study beyond first masters degree	1	
		4	10.0
4	Two bachelors degrees and M. Ed.	3	
	B. Ed. and M. Ed.	8	
3		11	27.5
	Two bachelors degrees and one year of graduate study	3	
2	B. Ed. and two years of graduate study	3	
	B. Ed. and one year of graduate study	1	10
1		6	25.0
	Two bachelors degrees		
2	B. Ed.	13	32.5
1	Less than a bachelors degree	2	5.0

^aThe information in this table was obtained from central office records.

TABLE VI

FREQUENCY DISTRIBUTION OF NUMBERS OF YEARS OF UNIVERSITY
 EDUCATION CREDITED FOR SALARY PURPOSES TO
 PRINCIPALS OF SCHOOLS IN SAMPLE^a
 (N = 40)

Number of years of university education credited for salary purposes ^b	1	2	3	4	5	6
Number of principals	1	1	0	9	8	21
						Mean
						5.13
						Standard deviation
						1.17

^aThe information in this table was obtained from central office records.

^bAssessed by the Faculty of Education, University of Alberta.

TABLE VII

FREQUENCY DISTRIBUTION OF NUMBERS OF YEARS WHICH
 HAD ELAPSED SINCE PRINCIPALS IN SAMPLE HAD
 UNDERTAKEN FORMAL TERTIARY EDUCATION^a
 (N = 40)

Category	Number of years since principal had under- taken formal tertiary education	Frequency	Percentage frequency
9	22 and higher	1	2.5
8	19 - 21	1	2.5
7	16 - 18	2	5.0
6	13 - 15	5	12.5
5	10 - 12	1	2.5
4	7 - 9	7	17.5
3	4 - 6	10	25.0
2	1 - 3	6	15.0
1	0	7	17.5
		Mean	6.71
		Standard deviation	6.18

^aThe information in this table was obtained from the responses of principals to Questionnaire A.

Experience variables of the principals. The frequency distribution of the number of years for which the principal had held his present position was bimodal, (Table VIII), with modes of one and six years, and a mean of 5.10 years.

Variables expressing the length of teaching and administrative experience were chosen as the number of years of teaching experience (including administration), the number of years as a principal of any school, the number of years as a teacher (including administration) with the city school system¹, and the number of years as a principal with the city school system¹. The four distributions of these variables, shown in Tables VIII and IX, were all close to normality.

The respondents had been principals of any school for from one to twenty-two years, with a mean of 11.81 years, (Table VIII). The range of their experience as principals in the city system was from one to sixteen years with a mean of 6.71 years, (Table VIII).

The number of years of teaching experience (classroom and administration) of the principals ranged from ten to forty-four with a mean of 26.78, (Table IX), whereas the number of years of teaching experience for schools of the city system ranged from six to twenty-eight with a mean of 18.35, (Table IX).

From these figures, it appeared that a considerable amount of teaching and administrative experience had been gained by the principals

¹As was mentioned in Chapter III, experience with the two adjacent suburban school districts before amalgamation was considered to be equivalent to experience with the city school district.

TABLE VIII

FREQUENCY DISTRIBUTIONS OF NUMBERS OF YEARS OF EXPERIENCE OF PRINCIPALS OF SCHOOLS IN SAMPLE, AS PRINCIPALS OF PRESENT SCHOOL, PRINCIPALS OF ANY SCHOOL, AND AS PRINCIPALS OF SCHOOLS IN THE CITY SYSTEM^a (N = 40)

Category	NUMBER OF YEARS AS PRINCIPAL OF ANY SCHOOL			NUMBER OF YEARS AS PRINCIPAL FOR SCHOOLS IN THE CITY SYSTEMS			NUMBER OF YEARS AS PRINCIPAL OF PRESENT SCHOOL		
	Range	Frequency	Percentage	Range	Frequency	Percentage	Range	Frequency	Percentage
8	22 & higher	2	5.0	15 - 16	4	10.0	12	1	2.5
7	19 - 21	4	10.0	13 - 14	4	10.0	11	1	2.5
6	16 - 18	3	7.5	11 - 12	8	20.0	10	1	2.5
5	13 - 15	9	22.5	9 - 10	7	17.5	9	3	7.5
4	10 - 12	9	22.5	7 - 8	5	12.5	8	3	7.5
3	7 - 9	5	12.5	5 - 6	7	17.5	7	3	7.5
2	4 - 6	5	12.5	3 - 4	2	5.0	6	1	10.0
1	1 - 3	3	7.5	1 - 2	3	7.5	5	1	2.5
							1	8	20.0
Mean		11.81			9.04			5.10	
Standard deviation		5.58			3.96			3.32	

^aThe information in this table was obtained from central office records, and from the responses of principals to Questionnaire A.

TABLE IX

FREQUENCY DISTRIBUTIONS OF NUMBER OF YEARS OF TOTAL TEACHING EXPERIENCE, AND
 TEACHING EXPERIENCE IN SCHOOLS OF THE CITY SYSTEMS,
 OF PRINCIPALS OF SCHOOLS IN SAMPLE^a
 (N = 40)

Category	NUMBER OF YEARS OF TEACHING EXPERIENCE ^b		NUMBER OF YEARS OF TEACHING EXPERIENCE IN SCHOOLS OF THE CITY SYSTEMS ^b	
	Range	Frequency	Range	Frequency
9	41 and higher	1	2.5	—
8	37 - 40	5	12.5	28 and higher
7	33 - 36	5	12.5	25 - 27
6	29 - 32	7	17.5	22 - 24
5	25 - 28	7	17.5	19 - 21
4	21 - 24	5	12.5	16 - 18
3	17 - 20	4	10.0	13 - 15
2	13 - 16	4	10.0	10 - 12
1	9 - 12	2	5.0	9 and lower
Mean		26.78		18.35
Standard deviation		8.40		5.82

^aThe information in this table was obtained from central office records, and from the responses of principals to Questionnaire A.

^b"Teaching experience" is taken to mean both classroom and administrative experience.

in other school districts. These four variables were all intercorrelated at the 0.005 level of significance, (Table X), and therefore probably measured much the same dimension.

Variables of the Teaching Staffs

It seemed that the ratio of the number of women to the number of men on the teaching staffs may be a relevant factor in the adoption process. The distribution of this variable shown in Table XI, was close to normal, and varied from 1.60 to 6.00 with a mean of 3.93.

The mean yearly percentage turnover of staff during the tenure of the principal in his present school could not be obtained from the school board records without appreciable difficulty because of the incompleteness of records following amalgamation, and because of the changes of names upon marriage. It was therefore decided to rely upon each principal's perception of this figure, which varied from 0 per cent to 35 per cent, with a mean of 19.5 per cent, (Table XI).

In nineteen of the forty schools, staff members were appointed by the principal to report to him concerning innovations which they considered would be useful.

Summary of Chapter IV

The variables chosen to describe the schools, principals and teachers, were generally normally distributed, and were interpreted as showing sufficient range to allow for the finding of any meaningful relationships between the variables and the Indices of Innovativeness. The

TABLE X

INTERCORRELATION MATRIX OF NUMBERS OF YEARS OF EXPERIENCE
 OF PRINCIPALS OF SCHOOLS IN SAMPLE, AS TEACHER AND
 AS PRINCIPAL IN ANY SCHOOL, AND IN
 SCHOOLS OF THE CITY SYSTEMS
 (N = 40)

Variable	1	2	3	4
1. Experience as teacher	1.000	0.635	0.753	0.532
2. Experience as principal		1.000	0.431	0.717
3. Experience as teacher in the city systems			1.000	0.548
4. Experience as principal in the city systems				1.000

All values were significant at the 0.005 level.

TABLE XI

FREQUENCY DISTRIBUTIONS OF MEAN YEARLY PERCENTAGE TURNOVER OF STAFF DURING
TENURE OF PRESENT PRINCIPAL, AND RATIO OF WOMEN TO MEN
ON TEACHING STAFFS OF SCHOOLS IN SAMPLE
(N = 40)

Category	MEAN YEARLY PERCENTAGE TURNOVER OF STAFF DURING TENURE OF PRINCIPAL ^a			RATIO OF WOMEN TO MEN ON TEACHING STAFFS ^b		
	Range	Frequency	Percentage frequency	Range	Frequency	Percentage frequency
9	35 and higher	1	2.5	5.30 and higher	2	5.0
8	31 - 34	1	2.5	4.90 - 5.29	2	5.0
7	27 - 30	3	7.5	4.50 - 4.89	3	7.5
6	23 - 26	10	25.0	4.10 - 4.49	8	20.0
5	19 - 22	13	32.5	3.70 - 4.09	11	27.5
4	15 - 18	2	5.0	3.30 - 3.69	7	17.5
3	11 - 14	2	5.0	2.90 - 3.29	4	10.0
2	7 - 10	5	12.5	2.50 - 2.89	2	5.0
1	6 and lower	3	7.5	2.49 and lower	1	2.5
Mean			19.50 per cent	3.93		
Standard deviation			7.68 per cent	0.71		

^aThis information was obtained during the interviews with the principals.

^bThis information was obtained from central office records.

dichotomous groups, for example, those formed on the basis of whether or not graduate study had been undertaken, were approximately equal in size in each of the four cases.

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CHAPTER V

CALCULATION OF THE INDICES OF INNOVATIVENESS

In order to determine the relationships between innovativeness and the characteristics of the schools, principals and teaching staffs described in Chapter IV, the construction of some measures of innovativeness using all five innovations was felt to be desirable. This decision was made because the adoption of individual new practices was not considered to be a sufficient indication of innovativeness. As Carlson found in his study:

. . . adoption performance on one innovation is not necessarily a reliable predictor of adoption performance on another innovation or several other innovations. (1, p. 53)

Two Indices of Innovativeness, I_1 and I_2 , were therefore developed, based respectively on adoption or non-adoption of the innovations, and on the extent to which the innovations were adopted within the schools. The decision to produce two indices was based on the belief that the adoption of a number of innovations is a different type of behavior than is the adoption in depth of the innovations.

The scores of each school on these two Indices were obtained by using the responses of the principals during the interviews.

Index of Innovativeness, I_1

A score of one was given for the adoption of each innovation and zero for non-adoption. The Index I_1 represents the total score, or the number of innovations which had been adopted by each school. I_1 scores of from

zero to five were therefore possible. The use of an equal weighting of one assumed that all innovations were equivalent and were equally difficult to introduce. Table XII shows the frequency of adoption of each innovation. Because of the shortage of teachers of French in elementary school, it was decided to allow a score of one for those schools in which the principal had unsuccessfully made a request for a teacher of French.

Departmentalization. In Chapter II, departmentalization was defined as occurring when one teacher teaches the same subject to more than one class in Grades 4, 5 or 6. However, as all the elementary schools in the sample were departmentalized to some extent in Music and Physical Education, a score of one was allotted only if departmentalization existed in at least one other subject. Thirty-two of the forty schools met this criterion.

Teaching of Oral French in Grades 5 and 6. Oral French was taught in twenty schools, and a further six principals indicated that they had unsuccessfully requested a teacher for this purpose. Twenty-six schools were therefore credited with adoption of this innovation.

Regular use of television as an educational aid. Thirty-three principals felt that television was being used regularly in their schools. All schools were equipped with either one or two television sets, and the fact that seven schools did not regularly use these sets may be explained in part by dissatisfaction expressed by the principals with the

TABLE XII

 FREQUENCY DISTRIBUTION OF NUMBER OF SCHOOLS
 ADOPTING EACH INNOVATION^a
 (N = 40)

Innovation	Frequency of adoption	Percentage frequency of adoption
Departmentalization	32	80.0
Consultants	36	90.0
Interviews	16	40.0
French		
Adopted	20)	50.0)
Requested teacher	6) 26	15.0) 65.0
Television	33	82.5

^aThe information in this table was obtained from the principals during interviews.

educational programs offered and by the paucity of such programs.

Regular use of central office consultants. Thirty-six principals indicated that they regularly requested consultative help for their teachers from the central office staff. Some such requests originally came from the teachers.

Use of parent-teacher interviews after early dismissal of pupils.

The practice of holding parent-teacher interviews from 3 - 5 p.m. after dismissal of the pupils one hour earlier than is usual, had been adopted by sixteen principals. All the other principals also held parent-teacher interviews, but on a less organized basis, and at a variety of different times.

Sum of number of innovations adopted. As is shown in Table XIII, five schools had adopted all five innovations, (giving an I_1 value of 5), sixteen schools had adopted four, fifteen had adopted three, four schools had adopted two, and no school had adopted only one or none of the innovations. The mean number of adoptions was 3.55. The distribution was negatively skewed over the range of scores from zero to five, but was approximately normal over the range of scores from two to five.

Index of Innovativeness, I_2

The second measure of innovativeness, I_2 , was developed in an endeavor to determine which variables were significantly related to the extent to which the five innovations were adopted within the schools, and

TABLE XIII

FREQUENCY DISTRIBUTION OF NUMBER OF INNOVATIONS
 ADOPTED (INDEX OF INNOVATIVENESS, I_1)
 BY SCHOOLS IN SAMPLE^a
 (N = 40)

Number of innovations adopted = Index of Innovativeness, I_1	Frequency	Percentage frequency
5	5	12.5
4	16	40.0
3	15	37.5
2	4	10.0
Mean	3.55	
Standard deviation	0.84	

^aThe information in this table was obtained from the principals during interviews.

to ascertain whether these variables were the same as those associated with adoption of the five educational innovations.

The score on the Index I_2 for each school was obtained by adding together the percentages of adoption of each innovation by that school, and then normalizing the scores by placing schools in the categories from one (lowest) to nine (highest) using the frequency distribution 2-2-5-7-8-7-5-2-2 described in Chapter IV.

Departmentalization. The percentage extent of adoption of departmentalization was calculated by substituting in this expression.

$$\frac{\text{sum of number of teachers teaching the same subject to more than one class in Grades 4, 5 or 6}}{\text{number of Grades 4, 5 and 6 teachers}} \times \frac{100}{1} \%$$

It was possible that percentages greater than 100 would be obtained by using this expression because some teachers were departmentalized in more than one subject. However percentages greater than 100 were not obtained, and the measure was appropriate for the purposes of this study because of the limited extent of departmentalization. Table XIV shows that the extent of departmentalization was rather low, with thirty schools having 40 per cent or less of the teachers operating on a departmentalized basis.

Teaching of Oral French in Grades 5 and 6. The percentage extent of adoption of Oral French in Grades 5 and 6 was calculated by substitution in this expression.

TABLE XIV

FREQUENCY DISTRIBUTIONS OF EXTENT OF ADOPTION OF DEPARTMENTALIZATION IN
 GRADES 4 - 6, TEACHING OF ORAL FRENCH IN GRADES 5 - 6,
 AND USE OF TELEVISION BY SCHOOLS IN SAMPLE^a
 (N = 40)

Range of percentage adoption ^b	DEPARTMENTALIZATION			ORAL FRENCH			TELEVISION		
	Frequency	Percentage frequency	Frequency	Percentage frequency	Frequency	Percentage frequency	Frequency	Percentage frequency	Frequency
100	0	0.0	5	12.5	2	5.0	2	5.0	2
91 - 99	1	2.5	0	0.0	3	7.5	3	7.5	3
81 - 90	1	2.5	1	2.5	1	2.5	1	2.5	1
71 - 80	0	0.0	2	5.0	0	0.0	0	0.0	0
61 - 70	3	7.5	3	7.5	2	5.0	2	5.0	2
51 - 60	2	5.0	1	2.5	2	5.0	2	5.0	2
41 - 50	3	7.5	3	7.5	1	2.5	1	2.5	1
31 - 40	4	10.0	0	0.0	5	12.5	5	12.5	5
21 - 30	7	17.5	3	7.5	5	12.5	5	12.5	5
11 - 20	8	20.0	2	5.0	7	17.5	7	17.5	7
1 - 10	3	7.5	0	0.0	5	12.5	5	12.5	5
0	8	20.0	20	50.0	7	17.5	7	17.5	7

^aThe information in this table was obtained from the principals during interviews.

^bThe methods used to calculate the percentage extent of adoption of each innovation are described on pages 60, 62 and 63.

$$\frac{\text{number of Grades 5 and 6 classes studying Oral French}}{\text{number of Grades 5 and 6 classes}} \times \frac{100}{1} \%$$

As is seen in Table XIV, five schools had completely adopted Oral French in Grades 5 and 6. The other fifteen adopting schools were approximately uniformly distributed throughout the range.

Regular use of television as an educational aid. The percentage extent of adoption of the regular use of television as an educational aid was calculated by substitution in this expression.

$$\frac{\text{average number of hours of use of each set per week} \times \text{average number of classes viewing each week}}{\text{number of classes in school}} \times \frac{100}{1} \%$$

This expression gives an estimate of the extent of use of television for schools with different numbers of sets, and does not penalize the schools with only one set. It also takes into account the fact that classes can be grouped to view programs, when it is not possible for each class to have its own set. Two percentages were obtained over 100 per cent. These were considered as being equivalent to 100 per cent for the purposes of this study. Table XIV shows that twenty-nine schools had an extent of adoption figure of 40 per cent or less, which probably was accounted for in part by a lack of suitable programs.

Regular use of central office consultants. The extent of use of consultants was obtained by asking the principal how often he had requested consultative help when such help may have been useful. Of the

thirty-six principals who had adopted regular use of consultants, one responded "Always," eleven "Very frequently," fourteen "Usually," and ten "Seldom," (Table XV). Twenty-six of the principals therefore made considerable use of the consultants: however, some indicated that the number of requests made was affected by a shortage of central office personnel.

To determine percentage extent of use of consultants, the responses were treated as scores, with "Always" being counted as 100 per cent, "Very frequently" as 75 per cent, "Usually" as 50 per cent, and "Seldom" as 25 per cent.

Use of parent-teacher interviews after early dismissal of pupils.

As is shown by Table XVI, six of the sixteen principals who held parent-teacher interviews after early dismissal of pupils used this practice on two occasions during the school year, and ten principals used it on one occasion. For the purpose of calculating I_2 , use on two occasions was considered as 100 per cent adoption, and use on one occasion as 50 per cent. This measure did not take into account the number of days for which these interviews ran: however, it was decided that the number of occasions on which the interviews were held, for example, November and March, was an effective measure of the dimension of innovativeness being assessed in this study.

Sum of extent of adoption of innovations. The sums of the percentages of adoption of the five innovations are shown in Table XVII.

TABLE XV

FREQUENCY DISTRIBUTION OF EXTENT OF ADOPTION OF REGULAR
 USE OF CONSULTANTS IN SCHOOLS IN SAMPLE^a
 (N = 40)

Principal's perception of number of requests for consultative help	Frequency	Percentage frequency
6 always	1	2.5
5 very frequently	11	27.5
4 usually	14	35.0
3 seldom	10	25.0
2 very seldom	0	0.0
1 never	4	10.0

^aThe information in this table was obtained from the principals during interviews.

TABLE XVI

FREQUENCY DISTRIBUTION OF EXTENT OF ADOPTION OF THE PRACTICE
 OF HOLDING PARENT-TEACHER INTERVIEWS AFTER EARLY
 DISMISSAL OF PUPILS IN SCHOOLS IN SAMPLE^a
 (N = 40)

Number of times parent-teacher interviews were held during school year after early dismissal of pupils	Frequency	Percentage frequency
2	6	15
1	10	25
0	24	60

^aThe information in this table was obtained from the principals
 during interviews.

TABLE XVII

FREQUENCY DISTRIBUTION OF SUMS OF PERCENTAGES OF ADOPTION
 OF FIVE INNOVATIONS (INDEX OF INNOVATIVENESS, I_2)
 FOR SCHOOLS IN SAMPLE
 ($N = 40$)

Category, or score on Index of Innovativeness, I_2	Range of sums of percentages of adoption of five innovations	Frequency	Percentage frequency
9	315-399	2	5.0
8	270-314	2	5.0
7	218-269	5	12.5
6	179-217	7	17.5
5	147-178	8	20.0
4	103-146	7	17.5
3	87-102	5	12.5
2	67-86	2	5.0
1	49-66	2	5.0

These percentages ranged from 49 to 399, with the range of potential scores being zero to 500. The ranges for each category were chosen so as to produce the close-to-normal distribution for I_2 described earlier.

Comparison of the Two Indices of Innovativeness with Each Other and with the Opinions of Three Officials

By using the procedures described above, I_1 scores were obtained varying from two to five, and I_2 scores from one to nine. The Pearson correlation coefficient between the scores on I_1 and I_2 was 0.641, which was significant at the 0.005 level.

In an attempt to determine whether the scores of the two Indices of Innovativeness actually represented the overall receptiveness to new practices of each school, the responses to the question listed in Appendix D were obtained from three central office officials. These officials independently assessed each school, placing it in one of six categories from "Least receptive to change" to "Most receptive to change." The categories were treated as scores from one to six, and an assessment of the combined opinion was obtained by adding the scores, and producing an approximately normal distribution of 3-4-5-4-7-5-5-4-3 in categories from one to nine. The small range of combined scores, four to eighteen, prevented formation of the 2-2-5-7-8-7-5-2-2 distribution described earlier.

These categories were treated as scores, and the individual and combined assessments of receptiveness to change were then correlated against I_1 and I_2 , and the results shown in Table XVII. Very high positive correlations, significant at the 0.005 level, were obtained between

the individual and combined scores of the three officials. The scores of two judges and the combined score were significantly correlated at the 0.05 level with I_1 , and the score of the other official was just significantly correlated with I_1 at the 0.01 level.

Although the factors which influenced the judgment of the three officials were not known, their opinions did not contradict the assessment of the innovativeness of each school made in this study by addition of the number of innovations adopted. The measure of agreement obtained lent support to the use of I_1 as an innovativeness measure whose relationships with other variables could be assessed with a reasonable degree of validity.

However, the correlation coefficients seen in Table XVIII, between the assessments of the officials and I_2 , were not significant at the 0.05 level, possibly indicating that the extent to which the innovations were adopted within each school was not as well known to the officials as was the number of innovations adopted, or it was not a factor which affected their scoring of innovative schools.

Summary of Chapter V

In order to assess two different dimensions of innovativeness, two Indices were developed. One, I_1 , measured the number of innovations adopted, and the other, I_2 , measured the extent to which the innovations were adopted within each school.

Thirty-two schools had adopted departmentalization to some extent in Grades 4 - 6, thirty-six used consultants regularly, sixteen held

TABLE XVIII

INTERCORRELATION MATRIX OF THE SCORES OF TWO INDICES OF
 INNOVATIVENESS AND INDIVIDUAL AND COMBINED SCORES OF
 INNOVATIVENESS GIVEN BY THREE JUDGES
 FOR SCHOOLS IN SAMPLE
 (N = 40)

Variable	1	2	3	4	5	6
1. I_1 (adoption)	1.000	0.641 ^c	0.341 ^a	0.367 ^b	0.323 ^a	0.353 ^a
2. I_2 (extent)		1.000	.068	-.068	.230	.055
3. Score: Judge 1			1.000	.712 ^c	.679 ^c	.914 ^c
4. Score: Judge 2				1.000	.604 ^c	.864 ^c
5. Score: Judge 3					1.000	.823 ^c
6. Combined score						1.000

^aSignificant at the 0.05 level.

^bSignificant at the 0.01 level.

^cSignificant at the 0.005 level.

parent-teacher interviews after early dismissal of pupils, twenty-six had French instruction or had requested a teacher of French, and thirty-three regularly used television as an educational aid.

The scores on I_1 were obtained by addition of the number of innovations adopted. These scores could have ranged from zero to five. Five I_1 scores of five were obtained, sixteen scores of four, fifteen scores of three, and four scores of two.

Various methods were employed to assess the extent of use of each innovation within each school. The measure of extent was in each case converted into a percentage. These percentages were added, so the potential totals could range from zero to 500. Totals of 49 to 399 were obtained, and these were placed in an approximately-normal nine-category distribution.

The individual and combined assessments of the innovativeness of the schools by three central office officials correlated significantly at the 0.05 level with I_1 , but were not significantly correlated at the 0.05 level with I_2 .

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CHAPTER VI

ANALYSIS OF THE DATA

The methods used to determine whether any significant relationships existed between innovativeness and the independent variables of the schools, principals and staffs, were the Pearson product-moment correlation and the t-test. The majority of the independent variables were continuous and suited to correlation tests. Although the distributions of some of the independent variables were not normal, the correlation technique seemed to be applicable in the light of a comment by Hays that it is not necessary to make any assumptions about the form of the distribution of variables in order to employ correlation and regression statistics. (4, p. 510)

Four of the independent variables were dichotomous, namely, whether or not the principal had undertaken graduate study, whether or not teachers were appointed to report to the principal concerning useful innovations, whether the principal's academic major was natural science/mathematics or social science/humanities, and whether the principal's major field of teaching interest was science/mathematics or social studies/humanities.

Scatter diagrams were drawn in an endeavor to determine whether curvi-linear relationships existed between the independent variables and the two Indices of Innovativeness. However such relationships did not appear to exist, and it may be that a larger sample would be needed to

detect curvi-linearity graphically.

Multiple regression analysis was used to determine which of the independent variables could best predict innovativeness, and also account for the greatest amount of variance in the dependent variables I_1 and I_2 .

Testing of the Hypotheses

Hypothesis 1. "Elementary school principals who have completed more years of formal tertiary education tend to be more innovative than elementary school principals who have completed fewer years of formal tertiary education."

The Pearson correlation coefficient between the number of years of formal tertiary education undertaken by the principal and I_1 was 0.079, and with I_2 -0.163; neither figure was significant at the 0.05 level, (Table XIX). The coefficients between I_1 and I_2 , and the number of years of education of the principals as assessed for salary purposes were 0.006 and -0.087, which were also not significant. Therefore Null Hypothesis 1 of no significant correlation between innovativeness and the number of years of formal tertiary education completed by a principal was accepted, and Hypothesis 1 rejected.

Hypothesis 2. "Elementary school principals who have completed some graduate study tend to be more innovative than elementary school principals who have not completed some graduate study."

As is seen in Table XX, the nineteen principals who had undertaken graduate study had a mean I_1 score of 3.68 as compared with 3.48 for the

TABLE XIX

INTERCORRELATION MATRIX OF THE SCORES OF NINETEEN CONTINUOUS INDEPENDENT VARIABLES AND
 THE SCORES OF THE TWO INDICES OF INNOVATIVENESS FOR SCHOOLS,
 PRINCIPALS AND STAFFS IN SAMPLE
 (N = 40)

Variables	1	2	3	4	5	6	7	Variables
1. Age of principal	1.000	0.015	0.110	0.373	0.201	0.022	0.049	1
2. Salary of principal		1.000	.665 ^b	.077	.025	.496 ^d	.579 ^d	2
3. Number of pupils			1.000	.320 ^c	.020	.344 ^c	.388 ^c	3
4. Pupil-teacher ratio				1.000	-.105	.241	.183	4
5. Ratio women:men on staff					1.000	.243	-.065	5
6. House value						1.000	.760 ^b	6
7. Soc.-sec. school planner							1.000	7
8. Soc.-sec. city planner								
9. Soc.-sec. combined								
10. Years teaching experience								
11. Years as a principal								
12. Years teaching in city								
13. Years principal in city								
14. Tenure in present school								
15. Level of education								
16. Education level - salary								
17. Years since education								
18. No. of councils								
19. % staff turnover								
20. I ₁ (adoption)								
21. I ₂ (extent)								

^aSignificant at the 0.05 level) For one-tailed tests concerned with Hypotheses 1-5, and correlations for which direction was predicted.

^bSignificant at the 0.01 level)

^cSignificant at the 0.05 level) For two-tailed tests concerned with correlation for which direction was not predicted.

^dSignificant at the 0.01 level)

TABLE XIX (continued)

	Variables	8	9	10	11	12	13	14	Variables
1.	Age of principal	-0.101	-0.008	0.816 ^b	0.578 ^b	0.609 ^b	0.502 ^b	0.381 ^c	1
2.	Salary of principal	.436 ^d	.555 ^d	.097	.351 ^c	.161	.147	-.122	2
3.	Number of pupils	.315 ^c	.421 ^d	.158	.467 ^d	.144	.334 ^c	-.016	3
4.	Pupil-teacher ratio	.087	.058	.374 ^c	.314	.369 ^c	.320 ^c	.009	4
5.	Ratio women:men on staff	-.080	.060	.092	.062	-.053	.040	-.111	5
6.	House value	.595 ^b	.856 ^b	.073	.247	.151	.090	-.219	6
7.	Soc.-sec. school planner	.671 ^b	.894 ^b	.105	.329 ^c	.123	.176	.019	7
8.	Soc.-sec. city planner	1.000	.840 ^b	-.081	.109	.106	.123	-.078	8
9.	Soc.-sec. combined			1.000	.026	.280	.133	.199	-.055
10.	Years teaching experience			1.000	.026	.280	.133	.199	9
11.	Years as a principal				1.000	.635 ^d	.753 ^d	.532 ^d	10
12.	Years teacher in city					1.000	.431 ^d	.717 ^d	11
13.	Years principal in city						1.000	.414 ^d	12
14.	Tenure in present school							.048	13
15.	Level of education							.548 ^b	14
16.	Education level - salary							1.000	1.000
17.	Years since education								
18.	No. of councils								
19.	% staff turnover								
20.	I ₁ (adoption)								
21.	I ₂ (extent)								

^aSignificant at the 0.05 level) For one-tailed tests concerned with Hypotheses 1-5, and correlations for which direction was predicted.

^bSignificant at the 0.01 level) For two-tailed tests concerned with correlation for which direction was not predicted.

^cSignificant at the 0.05 level) For one-tailed tests concerned with Hypotheses 1-5, and correlations for which direction was predicted.

^dSignificant at the 0.01 level) For two-tailed tests concerned with correlation for which direction was not predicted.

TABLE XIX (continued)

	Variables	15	16	17	18	19	20	21	Variables
1.	Age of principal	-0.089	-0.093	0.486 ^b	-0.244	0.098	-0.209	-0.281 ^a	1
2.	Salary of principal	.843 ^b	.803 ^b	-.028	.105	.259	.083	-.123	2
3.	Number of pupils	.499 ^d	.331 ^c	-.005	.009	.200	.147	-.140	3
4.	Pupil-teacher ratio	-.026	-.088	.315 ^c	-.210	-.016	-.213	-.320 ^c	4
5.	Ratio women:men on staff	-.079	-.101	.234	.288	.035	-.011	.107	5
6.	House value	.408 ^d	.415 ^d	.105	.082	.119	.168	.058	6
7.	Soc.-ec. school planner	.557 ^d	.511 ^d	.000	.035	.118	.187	-.015	7
8.	Soc.-ec. city planner	.231	.322 ^d	.019	-.045	.065	.253	.120	8
9.	Soc.-ec. combined	.448 ^d	.444 ^d	.049	-.005	.136	.230	.054	9
10.	Years teaching experience	-.002	-.004	.417 ^d	-.330 ^c	.240	-.052	-.261	10
11.	Years as a principal	.264	.053	.266 ^a	-.135	.152	.128	-.233	11
12.	Years teacher in city	.084	.130	.512 ^b	-.363 ^c	-.024	-.076	-.329 ^c	12
13.	Years principal in city	.040	-.118	.338 ^a	-.350 ^c	-.028	-.091	-.328 ^c	13
14.	Tenure in present school	-.070	-.294 ^c	.025	-.303 ^c	-.035	-.164	-.165	14
15.	Level of education	1.000	.818 ^b	-.024	.239	.149	.079	-.163	15
16.	Education level - salary		1.000	.022	.043	.081	.006	-.087	16
17.	Years since education			1.000	-.083	.131	-.213	-.334 ^a	17
18.	No. of councils				1.000	.010	.216	.246	18
19.	% staff turnover					1.000	.039	-.119	19
20.	I ₁ (adoption)						1.000	.641 ^b	20
21.	I ₂ (extent)							1.000	21

^aSignificant at the 0.05 level) For one-tailed tests concerned with Hypotheses 1-5, and correlations for which direction was predicted.

^bSignificant at the 0.01 level) For two-tailed tests concerned with correlation for which direction was not predicted.

^cSignificant at the 0.05 level) For one-tailed tests concerned with Hypotheses 1-5, and correlations for which direction was predicted.

^dSignificant at the 0.01 level)

TABLE XX
 COMPARISON OF MEANS OF TWO INDICES OF INNOVATIVENESS FOR SCHOOLS DIVIDED INTO
 SUBSAMPLES ON BASES OF GRADUATE STUDY AND APPOINTING OF TEACHERS
 TO REPORT ON USEFUL INNOVATIONS
 (N = 40)

Indices of Innovativeness	SCHOOLS DIVIDED INTO SUBSAMPLES ON BASIS OF WHETHER PRINCIPAL HAS UNDERTAKEN GRADUATE STUDY			SCHOOLS DIVIDED INTO SUBSAMPLES ON BASIS OF WHETHER PRINCIPAL APPOINTS TEACHERS TO REPORT ON USEFUL INNOVATIONS					
	Mean values of Index	Graduate study (N ₁ = 19)	No graduate study (N ₂ = 21)	Probability level of significance	Mean values of Index	Teachers appointed (N ₁ = 19)	Teachers not appointed (N ₂ = 21)	t value	Probability level of significance
I ₁ (adoption)	3.68	3.48	0.575	0.569	3.74	3.38	1.343	0.187	
I ₂ (extent)	5.05	4.95	0.157	0.876	4.95	5.05	0.157	0.876	

group of twenty-one principals who had not undertaken graduate study. The respective I_2 values were 5.05 and 4.95. Neither of the t values were significant at the 0.05 level. Therefore Null Hypothesis 2 of no significant difference between the mean values of the Index of Innovativeness for principals who have completed some graduate study and principals who have not completed some graduate study was accepted, and Hypothesis 2 rejected.

Hypothesis 3. "Elementary school principals who have completed formal tertiary education more recently tend to be more innovative than elementary school principals who have completed formal tertiary education less recently."

The correlation coefficient between the number of years since the principal had undertaken formal tertiary education and I_1 was -0.213, a value somewhat lower than the figure of -0.264 required for significance at the 0.05 level, but nevertheless high enough to be indicative of a trend. The correlation coefficient with I_2 was -0.334, which was significant at the 0.05 level.

In view of the significant negative correlation between I_2 and the number of years since the principal had undertaken formal tertiary education, and the negative correlation coefficient for this variable and I_1 , Hypothesis 3 can be accepted. However, if the aspects of adoption and extent of adoption of the innovations are considered separately, Null Hypothesis 3 must be accepted with respect to adoption of innovations, but rejected with respect to extent of adoption of innovations. Therefore

Hypothesis 3 was accepted with respect to extent of adoption of innovations.

Hypothesis 4. "Elementary schools in which at least one teacher is officially designated to bring the attention of the principal to useful innovations will tend to be more innovative than elementary schools in which such a teacher is not appointed."

Table XX shows that the mean value of I_1 for the nineteen principals who adopted this practice was 3.74, and for the twenty-one principals who did not use this practice, the mean I_1 value was 3.38. The t value for the difference between these means was 1.343 which was not significant at the 0.05 level.

The mean value of I_2 for principals using this practice was 4.95, and for those not using this practice, 5.05. The t value for the difference between these means was 0.157, which also was not significant.

Null Hypothesis 4 of no significant difference between the mean values of the Index of Innovativeness for principals who appoint teachers to report to them on useful innovations, and for principals who do not use this practice, was therefore accepted, and Hypothesis 4 rejected.

However, although teachers in some schools apparently suggested innovations to the principal, this practice may not have been used sufficiently often to have made it a major factor in adoption of innovations. Alternatively, the adoption and extent of adoption of these five particular innovations may not have depended upon individual teacher suggestion. At least with the use of consultants and parent-teacher

interviews, it would appear that the wishes of the principal, the central office staff, or the parents, could have been a more important factor than staff suggestion.

Hypothesis 5. "Elementary schools which are located in higher socio-economic attendance areas tend to be more innovative than elementary schools which are located in lower socio-economic attendance areas."

Four measures of socio-economic status of the attendance area of each school were obtained, and the correlation coefficients of these four measures with I_1 and I_2 are shown in Table XIX. The correlation coefficient of I_1 with the house value of the attendance area was 0.168, with the assessment of the school planner 0.187, with the assessment of the city planner 0.253, and the combined normalized assessment 0.230. These figures do not reach the value of 0.264 needed for significance at the 0.05 level. Nevertheless, the coefficients are all positive, and two are close to significance indicating that some meaningful connection between the innovativeness of a school and the socio-economic status of its attendance area does exist.

The correlation coefficients of I_2 with the above socio-economic assessments were respectively 0.058, -0.015, 0.120, and 0.054, none of which were significant at the 0.05 level.

Therefore, Null Hypothesis 5 of no significant correlation between the innovativeness of a school and the socio-economic status of its attendance area was accepted at the 0.05 level, and Hypothesis 5 rejected.

Determination of Other Relationships

In addition to testing the five hypotheses, this study attempted to determine whether significant relationships existed between the innovativeness of a school and fourteen other variables. No relationships were found to be significant at the 0.05 level between I_1 and these variables, but four relationships between I_2 and these variables were significant at the 0.05 level. As Table XIX illustrates, several other correlation coefficients were close to this level of significance.

The correlation coefficients between the age of the principal and I_1 and I_2 were -0.209 and -0.281, with the latter figure significant at the 0.05 level. I_2 was also negatively correlated at the 0.05 level of significance with the number of years for which the respondent had been both a teacher (-0.329) and a principal (-0.328) in the city area, and with the number of years since the respondent had undertaken formal tertiary education (-0.334, Hypothesis 3). However these four variables were highly intercorrelated (Table XXI), and may have measured one overall dimension or factor of the principal. The correlations between I_1 and, the age of the principal, the number of years for which the principal had been a teacher in the city area, and the number of years for which the principal had been a principal in the city area, were not significant at the 0.05 level, being -0.209, -0.076 and -0.091.

The total number of years of teaching experience of the principals produced a correlation coefficient with I_1 of -0.052, and with I_2 of -0.261, a figure just below that for significance at the 0.05 level.

TABLE XXI

INTERCORRELATION MATRIX OF THE AGES, YEARS OF EXPERIENCE
 AS A TEACHER, YEARS OF EXPERIENCE AS A PRINCIPAL,
 AND RECENCY OF EDUCATION, OF PRINCIPALS
 OF SCHOOLS IN SAMPLE
 (N = 40)

Variable	1	2	3	4
1. Age of principal	1.000	0.609 ^b	0.502 ^b	0.486 ^b
2. Years of teaching experience of principal		1.000	0.548 ^b	0.512 ^b
3. Years of experience of principal as a principal			1.000	0.338 ^a
4. Number of years since principal had undertaken formal tertiary education				1.000

^aSignificant at the 0.05 level.

^bSignificant at the 0.005 level.

The total number of years of experience as a principal in any school also did not correlate significantly at the 0.05 level with either I_1 or I_2 , with the respective coefficients being 0.128 and -0.233. A reasonable overall assessment of these findings appeared to be that the older and more experienced principals tended to be less innovative than the principals who were younger and less experienced in the school system.

It did not appear that the salary of the principal was associated with innovativeness as the correlation coefficient with I_1 was only 0.083, and with I_2 -0.123. (The correlation coefficient between age and salary was 0.015.) Likewise, the coefficients of I_1 and I_2 with the number of pupils in each school were not significant, being 0.147 and -0.140. However, the coefficients of I_1 and I_2 with the pupil-teacher ratio were -0.213 and -0.320, with the latter figure significant at the 0.05 level. That is, schools which had more pupils per class tended to adopt fewer innovations, and to adopt innovations less completely, than did schools with fewer pupils per class. These results indicate that the adoption of innovations, and the extent of adoption of innovations, are not affected by the size of the school, but rather by the size of the classes.

Neither the ratio of women to men on the staff, nor the perceived mean yearly percentage turnover of staff were correlated significantly at the 0.05 level with either I_1 or I_2 , as the respective coefficients were -0.011 and 0.039 with I_1 , and 0.107 and -0.119 with I_2 .

The correlation coefficients for the number of years for which the principal had occupied his present position with I_1 and I_2 were -0.164

and -0.165 respectively, with neither value being close to the 0.05 level of significance.

The number of memberships in teachers' association councils was close to being significantly correlated with innovativeness, with the I_1 coefficient being 0.216 and the I_2 coefficient 0.246. This variable may actually be related to a broader variable such as professionalism, found to be significant by Carlson. (1, pp. 53-66)

Fifteen principals named a natural science or mathematics as their academic major. This group achieved a mean value of 3.67 for I_1 and 5.13 for I_2 ; however, these means were not significantly different at the 0.05 level from the figures of 3.48 and 4.92 obtained by the twenty-five principals who had studied a social studies or humanities major, (Table XXII).

Similarly, the twenty-two principals who named natural science or mathematics as their major area of teaching interest scored slightly higher on I_1 and I_2 than did the eighteen principals who preferred teaching social studies or humanities, but the differences between the means were not significant at the 0.05 level. The mean values of I_1 and I_2 for the science/mathematics group were 3.68 and 5.36 as compared with 3.39 and 4.56 for the social studies/humanities group, (Table XXII).

Multiple Regression Analysis

Two multiple regression analyses were performed, one with I_1 and one with I_2 , in order to determine which independent variables best predicted innovativeness and accounted for the greatest amount of variance in the two dependent variables. In each analysis, the fifteen independent

TABLE XXII

COMPARISON OF MEANS OF TWO INDICES OF INNOVATIVENESS FOR SCHOOLS DIVIDED INTO SUBSAMPLES
ON BASES OF ACADEMIC MAJOR AND TEACHING SUBJECT INTEREST OF PRINCIPAL
(N = 40)

Indices of Innovativeness	SCHOOLS DIVIDED INTO SUBSAMPLES ON BASIS OF ACADEMIC MAJOR OF PRINCIPAL			SCHOOLS DIVIDED INTO SUBSAMPLES ON BASIS OF TEACHING SUBJECT INTEREST OF PRINCIPAL		
	Mean values of Index	Probability of significance	Mean values of Index	Probability of significance	Social science/ mathematics	Social studies/ humanities
I_1 (adoption)	3.67	3.48	0.671	0.506	3.68	3.39
I_2 (extent)	5.13	4.92	0.325	0.747	5.36	4.56

continuous variables and the four dichotomous variables were used. The results are shown in Table XXIII.

In both analyses, three variables had t values higher than that necessary for significance as predictors at the 0.05 level in multiple regression analysis. These t values are described in the following way.

The quantity t . . . which is distributed in a t -distribution with $N-n-1$ degrees of freedom is a measure of the contribution of the variable X_n to the regression after the variables X_1, X_2, \dots, X_{n-1} have been included in the regression. (2, p. 6)

The most significant predictors of the I_1 score were, in order, the pupil-teacher ratio, the socio-economic status of the attendance area of the school, and whether or not the principal appoints teachers to report on useful innovations. These three variables accounted for 12.9 per cent of the variance in I_1 .

Of these variables, only the pupil-teacher ratio was seen to be also a significant predictor of the I_2 score. The most significant predictors of the I_2 score were, in order, the recency of the principal's education, the teaching interest area of the principal, and the pupil-teacher ratio: these accounted for 18.3 per cent of the variance in I_2 .

These percentages are small as compared with those obtained by Carlson for the first three variables, (1, p. 56) but this is accounted for by the fact that this study was concerned with an examination of only some of the variables responsible for variation in the adoption and extent of adoption of innovations. Some of the other relevant variables, and their effects on I_1 and I_2 , were examined in the two companion studies.

TABLE XXXIII

RESULTS OF MULTIPLE REGRESSION ANALYSES USING NINETEEN INDEPENDENT VARIABLES OF SCHOOLS
IN SAMPLE, WITH TWO INDICES OF INNOVATIVENESS (I_1 AND I_2) AS CRITERION VARIABLES
($N = 40$)

Index of Innovativeness	Order of entry in regression analysis	Name of variable	100R ²	Computed R	Corrected ^a R _C	Cumulated percentage of variance in Index accounted for by R _C
I_1 (adoption)	1	Pupil-teacher ratio	6.55	0.255	0.255	6.55
	2	Socio-economic status of attendance area of school	12.6	.355	.321	10.3
	3	Principal appoints teachers to report on innovations	17.3	.416	.359	12.9
I_2 (extent)	1	Recency of education	11.2	.335	.335	11.2
	2	Principal's teaching inter- est area	17.9	.423	.397	15.7
	3	Pupil-teacher ratio	22.5	.474	.428	18.3

^aThe method used to correct R is that described by Garrett. (3, pp. 416-417) This correction was applied because the small sample size produced inflation in the values of R.

Summary of Chapter VI

The number of the five chosen innovations adopted by the forty schools in this study, I_1 , was shown to be positively correlated at the 0.01 level of significance with the extent to which these innovations were adopted, I_2 , but was not significantly correlated with or related to any of the independent variables selected for examination.

The significant correlation between I_1 and I_2 could be anticipated because of the manner in which the Indices were calculated, and also because it would not seem to be realistic to propose that most of the schools adopting a high number of the five innovations would adopt them only superficially. The results showed that adoption and extent of adoption appear to represent different dimensions of innovativeness.

However, positive correlations approaching significance at the 0.05 level, were obtained between the number of innovations adopted (I_1), and the socio-economic status of the school attendance area and the number of teachers' association councils to which the principal belonged. Negative correlations approaching the 0.05 level of significance existed between the number of innovations adopted and the age of the principal, the pupil-teacher ratio, and the number of years since the principal had undertaken formal tertiary education.

Some different relationships were recorded with the extent to which these five innovations were adopted, (I_2). The extent of adoption was negatively correlated at the 0.05 level of significance or higher, with the age of the principal, the pupil-teacher ratio, the number of

years for which the principal had been a teacher in the city system, the number of years for which the principal had been a principal in the city system, and the number of years since the principal had undertaken formal tertiary education.

A positive relationship approaching significance at the 0.05 level existed between the extent of adoption and the number of teachers' association councils to which the principal belonged. Negative correlations approaching significance at the 0.05 level existed between the extent of adoption and the number of years of teaching experience of the principal, and the number of years for which the principal had been principal of any school.

The differences in the numbers of innovations adopted by the schools is best explained by differences in the pupil-teacher ratio, the socio-economic status of the attendance area of the school, and whether or not the principal appoints teachers to report on useful innovations. Differences in the recency of the principal's education, the teaching interest area of the principal, and the pupil-teacher ratio, were the best predictors of the extent to which the five innovations were adopted.

Some of the variables did not show significant or near-significant relationships at the 0.05 level with either adoption or extent of adoption. These were the salary of the principal, the number of pupils, the ratio of women to men on the staff, the tenure of the principal in his present school, the level of the principal's education, the annual mean percentage turnover of staff, the principal's academic major, the principal's

major field of teaching interest, and the practice of appointing teachers to report to the principal on useful innovations.

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CHAPTER VII

SUMMARY OF THE STUDY AND ITS FINDINGS

Summary of the Literature on the Diffusion of Educational Innovations

The manner of diffusion of educational innovations is still imperfectly understood, particularly in comparison with the results of research into the spread of innovations in the fields of medicine and agriculture. Several writers have considered that the absence from the educational scene of the change agents known in other areas may be at least partly responsible for the relative tardiness of educational systems to adopt new practices, as compared with medicine, agriculture and other areas.

If the benefits of recent developments in curriculum and educational technology are to become available to all school systems, the adoption process must be more fully understood. Considerable change is occurring, but this change frequently encounters a barrier in the form of stability of educational institutions. Better understanding of the advantages of this stability, and ways in which it can be overcome when it impedes the introduction of new practices, is essential.

The original studies in the spread of educational innovations were performed at Columbia University by Mort and his associates: these focused on the cost factor as the dominant variable. Other studies, such as that of Carlson, have concentrated on the superintendent of a school system as the focal point for change. This stand is supported by

learned opinion; nevertheless, several authors have stressed the need for examination of the part played by principals and teachers in individual schools.

Summary of the Study

This study then, was an attempt to determine whether variables associated with the principals and teachers, as well as variables associated with individual elementary schools, within one school system, influenced the adoption of educational innovations. An innovation was taken to be a new practice whose acceptance could easily be discovered, and which had been introduced sufficiently recently for a considerable proportion of the population to be still in the process of adopting it. Following discussions with personnel familiar with the elementary schools of the city school system, five innovations were selected--departmentalization of staff in Grades 4 - 6, regular use of central office consultants, holding of parent-teacher interviews after early dismissal of pupils, teaching of Oral French, and regular use of television as an educational aid.

In order to obtain a sample which was free from too many complicating factors, the elementary schools of one city system were used. Most of the forty schools in the sample contained at least twelve classrooms, and the principals therefore had at least 70 per cent of their time free from classroom teaching.

Data were collected by examination of records at the offices of the school district and city, and by questionnaires submitted to and

interviews conducted with principals and central office officials of the school district. From the information obtained by interviewing the principals, two Indices of Innovativeness were developed, I_1 being the measure of the number of innovations adopted, and I_2 a measure of the extent to which the five innovations had been adopted throughout each school.

The relationships between these two Indices and nineteen independent variables related to the school, the teaching staff, and the personal, academic, professional and experience variables of the principal, were investigated using product-moment correlations, t-tests, and multiple regression analyses. Five hypotheses were postulated, linking innovativeness positively with the number of years of formal tertiary education of the principal, the recency of the principal's education, and the socio-economic status of the attendance area of the school, and suggesting that those schools in which the principal had undertaken graduate study, or had appointed teachers to report to him on useful innovations, will tend to score higher on innovativeness. Research or learned opinion did not support relationships between innovativeness and the other fourteen variables, so these were investigated as associated problems.

Summary of the Findings

Analysis of the findings showed that the extent of adoption of the innovations (I_2) was negatively correlated at the 0.05 level or higher with the age of the principal, the pupil-teacher ratio, the number of years for which the principal had been a teacher in the city system, and

the number of years since the principal had undertaken formal tertiary education. No variables were significantly related at the 0.05 level or higher with the number of innovations adopted (I_1).

Correlations approaching the 0.05 level of significance were obtained with the socio-economic status of the attendance area (I_1 , positive), the number of teachers' association councils to which the principal belonged (I_1 and I_2 , positive), the age of the principal (I_1 , negative), the pupil-teacher ratio (I_1 , negative), the number of years since the principal had undertaken formal tertiary education (I_1 , negative), the number of years of teaching experience of the principal (I_2 , negative), and the number of years of experience of the principal as principal of any school (I_2 , negative).

Therefore, the only hypothesis which was substantiated at the 0.05 level was Hypothesis 3 which connected innovativeness to recency of education, and this was in connection with the extent to which the innovations were adopted, and not with the number of innovations adopted.

Multiple regression analysis revealed that the variation in the number of innovations adopted by the schools was best explained by the pupil-teacher ratio, the socio-economic status of the attendance area of the school, and whether or not the principal appointed teachers to report on useful innovations. Variation in extent of adoption of the five innovations was best explained by the recency of the principal's education, the principal's major area of teaching interest, and the pupil-teacher ratio.

When the results of this study were compared with those of Carlson in the study reported in Chapter II, agreement was noted in the positive relationship between innovativeness and recency of education, which Carlson found in Allegheny County, Pennsylvania. However, the level of education of the principal was not found to be significantly connected with innovativeness, although Carlson found a positive relationship for superintendents in Allegheny County. Some support was obtained for the West Virginia finding that the more professional officials tended to be more innovative, using membership in teachers' association councils as a measure of professionalism. The other studies conducted in conjunction with this one investigated some of the aspects found to be significant by Carlson.

Contrary to Griffiths' finding reported in Chapter II, the age and experience of the principals were found to be significant factors in the adoption of innovations. The nearly significant relationship between innovativeness and socio-economic status of the attendance area lends support to the finding of Kumpf noted in Chapter II.

Suggestions for Further Research

The findings of this study have shown that, for at least one school system, the principal is a significant figure in the adoption of educational innovations. Carlson placed the superintendent in a focal innovating position and substantiated this view by his findings. It would appear to be sound to postulate that all educators in positions of authority, including teachers, exert some influence on the adoption of

new practices, and that in any given educational system, various types of innovations require the approval of personnel at different administrative levels.

Further research along the lines of this study in the larger urban school systems of Vancouver, Winnipeg, Toronto and Montreal would help to determine whether the findings of this study have general applicability. Research of the type performed by Carlson could be carried out in Canada in school districts where the superintendents are locally appointed if a sufficiently large sample can be obtained.

It may justifiably be said that a considerable amount of research needs to be performed before the factors influencing the spread and adoption of new educational practices are fully understood.

APPENDIX A

DATA SHEET

INFORMATION OBTAINED FROM SCHOOL BOARD RECORDS

DATA SHEET

Information Obtained from School Board Records.

SCHOOL _____ PRINCIPAL _____ CODE _____

1. Age of principal 62-65 _____ 46-49 _____
 58-61 _____ 42-45 _____
 54-57 _____ 38-41 _____
 50-53 _____ 34-37 _____

2. Salary of principal, September 1965 \$ _____

3. Number of pupils, September 1965 _____

4. Number of teachers, September 1965 _____

5. Pupil-teacher ratio, September 1965 _____

6. Ratio of men to women on staff, September 1965 _____

7. Total number of years of teaching experience of
 principal to September 1965 _____

8. Tenure of principal in present school _____

9. Actual degrees and diplomas held by principal,
 September 1965 _____

10. Number of years of university education of
 principal as assessed for salary purposes _____

APPENDIX B

QUESTIONNAIRES SUBMITTED TO PRINCIPALS

QUESTIONNAIRE A

SCHOOL _____ PRINCIPAL _____ CODE _____

1. How many hours do you teach each week?

a. nil _____ f. 9 or 10 _____
b. 1 or 2 _____ g. 11 or 12 _____
c. 3 or 4 _____ h. 13 or 14 _____
d. 5 or 6 _____ i. 15 or 16 _____
e. 7 or 8 _____

2. What was your major academic subject at university? _____

3. Which subject are you most interested in teaching? _____

4. For how many years have you been a principal? _____

5. For how many years have you taught (classroom and administration) for:

(a) Edmonton Public School Board? _____
(b) Jasper Place or Beverly Divisions before amalgamation? _____

6. For how many years have you been a principal for:

(a) Edmonton Public School Board? _____
(b) Jasper Place or Beverly Divisions before amalgamation? _____

7. (a) At which, Edmonton, Jasper Place or Beverly school were you teaching immediately prior to your promotion as vice-principal or principal? _____

(b) Who was the principal in that school at that time? _____

8. What was the latest year in which you received formal education?

(a) On a part-time basis, i.e. summer school or evening courses, 19___.
(b) On a full-time or resident basis, 19___.

9. (a) Which of the following practices would you consider to be innovations in the elementary schools operated by the Edmonton Public School Board?

programmed learning _____

modern maths _____

QUESTIONNAIRE A (2)

SCHOOL _____ PRINCIPAL _____ CODE _____

9. (a) continued

use of educational telecasts _____
organization of in-service education by the principal _____
use of radio _____
organized lunch-hour and after school intramural sports _____
requests for help from EPSB consultants _____
use of tape-recorders _____
regular showing of 16 mm. films _____
team teaching _____
use of subject teachers, rather than generalists _____
the teaching of French _____
regular scheduling of parent-teacher interviews during school hours _____

(b) What other practices would you consider as innovations?

10. What is your religious preference?

1. Anglican	_____	5. none	_____
2. Catholic	_____	6. Presbyterian	_____
3. Jewish	_____	7. United Church	_____
4. Lutheran	_____	8. Other - Specify	_____

11. What was your father's occupation when you graduated from high school?

QUESTIONNAIRE B

SCHOOL _____ PRINCIPAL _____ CODE _____

1. Which newspapers do you regularly read? (Exclude the Edmonton Journal.) Please write the titles down.

0. none

1. _____

2. _____

3. _____

4. _____

5. _____

2. Which magazines do you regularly read? Exclude professional journals. Please write the titles of the magazines.

0. none

1. _____

2. _____

3. _____

4. _____

5. _____

3. Which professional journals do you regularly read? Please indicate the titles.

0. none

1. _____

2. _____

3. _____

4. _____

5. _____

Please circle Yes or No.

Yes No 4. Barring unforeseen changes, would you remain with the E.P.S.B. permanently?

Yes No. 5. Were you a teacher in this school immediately preceding your appointment as principal here?

QUESTIONNAIRE B (2)

SCHOOL _____ PRINCIPAL _____ CODE _____

Yes No 6. Have you ever taught outside Alberta?

Yes No 7. Have you ever taught outside Edmonton, Jasper Place, and Beverly, but within Alberta?

Yes No 8. Were you ever a principal outside Alberta?

Yes No 9. Were you ever a principal outside Edmonton, Jasper Place, and Beverly, but within Alberta?

Yes No 10. Would you accept a position with the Calgary Public Schools which would mean a distinct improvement in your professional career?

Yes No 11. Would you accept a position with a city school board outside Alberta which would mean a distinct improvement in your professional career?

Please check off (✓) the appropriate spaces.

12. To which Specialist Council(s) do you belong?

- a) Business Education Council
- b) English Council
- c) Fine Arts Council
- d) Guidance Council
- e) Health and Physical Education Council
- f) Home Economics Council
- g) Industrial Arts and Vocational Education Council
- h) Mathematics Council
- i) Modern and Classical Language Council
- j) Council on School Administration
- k) School Library Council
- l) Science Council
- m) Social Studies Council

QUESTIONNAIRE B (3)

SCHOOL _____ PRINCIPAL _____ CODE _____

13. To which educational organizations do you belong? Leave out the A.T.A. and its Councils, and the C.T.F. Add the names of those that do not appear on this list but to which you belong.

- ____ a) Phi Delta Kappa
- ____ b) American Educational Research Association
- ____ c) The Canadian College of Teachers
- ____ d) _____
- ____ e) _____

14. How many schools have you visited in the past six months to observe new educational practices? Circle the correct number.

0. none	3. three	6. six
1. one	4. four	7. seven
2. two	5. five	8. eight or more

15. With how many teachers and administrators not employed by the E.P.S.B. but living in Alberta do you regularly discuss new educational practices? Include correspondence. Circle the appropriate number.

0. none	4. four	8. eight
1. one	5. five	9. nine
2. two	6. six	10. ten
3. three	7. seven	11. eleven or more

16. With how many teachers and administrators living outside Alberta do you regularly discuss new educational practices. Include correspondence. Circle the appropriate number.

0. none	4. four	8. eight
1. one	5. five	9. nine
2. two	6. six	10. ten
3. three	7. seven	11. eleven or more

Yes No 17. Would you say that you get most of your intellectual stimulation from sources outside E.P.S.B. personnel?

Yes No 18. Would you say that you get most of your professional stimulation from E.P.S.B. personnel?

QUESTIONNAIRE B (4)

SCHOOL _____ PRINCIPAL _____ CODE _____

19. In which political and/or social and/or civic organizations are you an active member? Leave out strictly educational or professional organizations but include such organizations as the Better Education Association.

20. Do you usually feel more satisfied after a teachers' meeting which features: (Check one of the following blanks.)
an outstanding local speaker _____
an outstanding outside speaker _____

21. Some people have said that the teaching profession is composed of two types of persons: (Indicate by a single check in one of these four blanks which type of persons you are like.)

I am a little
like this type
of person.

I am very
much like
this type of
person.

Persons who are more interested
in local problems. 1. _____

2. _____

Persons who are more interested
in problems everywhere. 3. _____

4. _____

APPENDIX C

SCHEDULE OF INTERVIEW CONDUCTED WITH PRINCIPALS

SCHEDULE OF INTERVIEW CONDUCTED WITH PRINCIPALS

SCHOOL _____ PRINCIPAL _____ CODE _____

1. Have you made it a regular practice during your tenure as principal of this school, to have staff members appointed to report to you concerning innovations which they feel would be useful?

Yes _____ No _____

2. What would be the average percentage turnover of staff during your tenure as principal of this school? _____ %

3. How many teachers on your staff fit into each of the six salary schedule categories?

1. _____
2. _____
3. _____

4. _____
5. _____
6. _____

4. (a) Does this distribution fairly represent the situation during your tenure?

Yes _____ No _____

(b) If No, has the general level of training increased _____ or decreased _____?

5. How do you rate the desire of the Edmonton Public School Board administration to introduce innovations into the elementary program?

a. very high _____
b. high _____
c. well above average _____
d. just above average _____
e. just below average _____
f. well below average _____
g. low _____
h. very low _____

INTERVIEW SCHEDULE (2)

SCHOOL _____ PRINCIPAL _____ CODE _____

6. Choose from the Edmonton Public School Board elementary school principals whom you know, the three you consider to be the most innovative. Rank in order.

1. _____
2. _____
3. _____

7. Rank the three E.P.S.B. elementary school principals to whom you turn most frequently for advice about the school program.

1. _____
2. _____
3. _____

8. How would you rate yourself with respect to time of adoption of innovations as compared with other E.P.S.B. elementary school principals?

- a. very early _____
- b. relatively early _____
- c. just earlier than average _____
- d. just later than average _____
- e. relatively late _____
- f. very late _____

9. Which person or group do you consider to be the most accurate assessor of your work as a principal? _____

10. How do you rate your freedom to introduce innovations into your school?

- a. completely free _____
- b. considerable amount of freedom _____
- c. slight amount of freedom _____
- d. slightly restricted _____
- e. considerably restricted _____
- f. completely restricted _____

11. With which three elementary school principals in your school district do you have the greatest amount of voluntary association? List in order. (Three best friends)

1. _____
2. _____
3. _____

INTERVIEW SCHEDULE (3)

SCHOOL _____ PRINCIPAL _____ CODE _____

12. Which person or group do you consider to be the most important assessor of your work as a principal? _____

13. What overall competence rating would you give your present staff as compared with other teachers you know?

- a. very high _____
- b. high _____
- c. well above average _____
- d. just above average _____
- e. average _____
- f. just below average _____
- g. well below average _____
- h. low _____
- i. very low _____

14. How has the overall staff competence changed during your tenure as principal?

- a. improved _____
- b. no significant change _____
- c. decreased _____

15. What overall rating would you give your present staff for cooperation with you?

- a. very high _____
- b. high _____
- c. well above average _____
- d. just above average _____
- e. average _____
- f. just below average _____
- g. well below average _____
- h. low _____
- i. very low _____

16. How has the staff's cooperation with you changed during your tenure as principal?

- a. improved _____
- b. no significant change _____
- c. decreased _____

INTERVIEW SCHEDULE (4)

SCHOOL _____ PRINCIPAL _____ CODE _____

17. How do you rate the extent of participation by your present staff in professional meetings and conferences?

- a. very high _____
- b. high _____
- c. well above average _____
- d. just above average _____
- e. average _____
- f. just below average _____
- g. well below average _____
- h. low _____
- i. very low _____

18. How has this participation altered during your tenure as principal?

- a. improved _____
- b. no significant change _____
- c. decreased _____

INTERVIEW SCHEDULE (5)

SCHOOL _____

I. DEPARTMENTALIZATION - Meaning that one teacher teaches the same subject to more than one class in grades four, five, or six.

1. a. Did you use this practice in any other school in which you were principal?

Yes _____ No _____ Not Applicable _____

b. If Yes, when did you introduce it? 19 ____.

2. Are you at present using departmentalization?

Yes _____ No _____

If Yes, 3. In which subjects are you using it?

How many teachers are teaching the same subject to more than one class?

<u>SUBJECT</u>	<u>NO. TEACHERS</u>	<u>SUBJECT</u>	<u>NO. TEACHERS</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4. When did you first use it in this school? 19 ____.

5. Was departmentalization being used when you were appointed to this school?

Yes _____ No _____

6. Where did the suggestion for departmentalization of your school come from?

a. You _____ If so, where did you first hear of the practice as being applicable to elementary schools?

b. Staff _____

c. Central office _____

d. Others _____ Specify _____

INTERVIEW SCHEDULE (6)

SCHOOL

If No, 7. Have you ever used it? Yes _____ No _____

If Yes,

8. When did you first introduce it? 19 .
9. When did you discontinue departmentalization? 19 .
10. Please rate the practice of elementary school departmentalization in terms of the following characteristics (to be completed by all principals).

no advantage

1 2 3 4 5 6 7 8 9

100%

advantage

b. Compatibility - the degree to which the practice of elementary school departmentalization is compatible (or harmonious) with other aspects of elementary education.

c. Complexity - the relative difficulty of using elementary school departmentalization as compared with non-departmentalization.

d. Divisibility - the degree to which departmentalization may be tried on a limited basis.

1 2 3 4 5 6 7 8 9
not easily
divisible divisible

e. Communicability - the relative ease of communicating the ideas and/or results of elementary school departmentalization to other principals.

INTERVIEW SCHEDULE (7)

SCHOOL

II. USE OF SCHOOL BOARD CONSULTANTS

1. a. Did you regularly use this practice in any other school in which you were principal?

b. If Yes, when did you introduce it? 19 .

2. Are you at present regularly using consultants?

If Yes, 3. How frequently have you asked for consultative help as compared with the number of times that you feel such help might have been of use?

4. When did you first use it in this school? 19 .

5. Were consultants being used in this school prior to your appointment? Yes _____ No _____

6. What is the most common source of suggestions for the use of E.P.S.B. consultants?

a. You

b. Staff

s. Central office

If No, 7. Have you ever regularly requested
ants? Yes _____ No _____

8. When did you first regularly request this help? 19 .

9. When did you discontinue requesting this help on a regular basis?
19

10. Please rate the use of E.P.S.B. consultants in terms of the following characteristics.

a. Relative Advantage - the relative advantage of using school board consultants in achieving the goals of elementary education as compared with the use of consultants, such as the principal, who are resident in the school.

INTERVIEW SCHEDULE (8)

SCHOOL _____

b. Compatibility - the degree to which the practice of using E.P.S.B. consultants is compatible with other aspects of elementary education.

1	2	3	4	5	6	7	8	9
least compatible								most compatible

c. Complexity - the relative difficulty of using E.P.S.B. consultants as compared with using resident staff in the elementary school.

1	2	3	4	5	6	7	8	9
not complex								very complex

d. Divisibility - the degree to which consultants may be used on a limited basis.

1	2	3	4	5	6	7	8	9
not divisible								easily divisible

e. Communicability - the relative ease of communicating the ideas and/or results of the use of consultants to other principals.

1	2	3	4	5	6	7	8	9
not communicable								easily communicable

COMMENTS

III. INTERVIEWS WITH PARENTS - This practice means the occasional provision of time for parents to meet teachers during normal school hours by dismissing classes earlier than usual.

1. a. Did you use this practice in any other school in which you were principal?

Yes _____ No _____ Not Applicable _____

b. If Yes, when did you introduce it? 19___.

INTERVIEW SCHEDULE (10)

SCHOOL _____

c. Complexity - the relative difficulty of holding parent-teacher interviews during school hours as compared with out of school hours.

1	2	3	4	5	6	7	8	9
not								very
complex								complex

d. Divisibility - the degree to which such arrangements for parent-teacher interviews may be tried on a limited basis (not involving the whole school).

1	2	3	4	5	6	7	8	9
not								easily
divisible								divisible

e. Communicability - the relative ease of communicating to other principals the ideas and/or results of holding parent-teacher interviews during school hours.

1	2	3	4	5	6	7	8	9
not								easily
communicable								communicable

COMMENTS

IV. FRENCH INSTRUCTION - watching the French lessons on TV is not considered as French instruction, unless followup teaching also occurs.

1. a. Was French instruction given in any other school in which you were principal?

Yes _____ No _____ Not applicable _____

b. If Yes, when did you introduce it? 19 ____.

2. Do you have any teachers on your staff capable of teaching French?

Yes _____ No _____

If Yes, 3. Is there at present any French instruction given in your school? Yes _____ No _____

4. How many teachers are capable of giving French instruction? _____

5. How many teachers are giving French instruction? _____

INTERVIEW SCHEDULE (11)

SCHOOL

6. When did you first arrange for French instruction in this school?
19__.

7. Was French instruction being given when you were appointed to this school?

Yes _____ No _____

8. Where did you get the idea to introduce French instruction?

a. You _____ If so, where did you first hear of the practice?

b. Staff _____

c. Central office _____

d. Others _____ Specify _____

9. Have you requested that a teacher capable of teaching French be added to your staff? Yes _____ No _____

10. When did you first make this request? 19__.

11. Where did you get the idea to introduce French instruction?

a. You _____ If so, where did you first hear of the practice?

b. Staff _____

c. Central office _____

d. Others _____ Specify _____

12. Has French instruction ever been given in this school during your tenure? Yes _____ No _____

13. When did you first introduce it? 19__.

14. When did you discontinue this practice? 19__.

15. Please rate the practice of teaching French in elementary schools in terms of the following characteristics:

a. Relative Advantage - the relative advantage of French instruction in achieving the aims of elementary education as compared with the subjects which it partially replaced.

1 no advantage	2	3	4	5	6	7	8	9 100% advantage
----------------------	---	---	---	---	---	---	---	------------------------

INTERVIEW SCHEDULE (12)

SCHOOL _____

b. Compatability - degree to which the practice of teaching French is compatible with other aspects of elementary education.

1	2	3	4	5	6	7	8	9
least compatible								most compatible

c. Complexity - the relative difficulty of incorporating French instruction in the elementary school.

1	2	3	4	5	6	7	8	9
not complex								very complex

d. Divisibility - the degree to which French can be taught on a limited basis. (Not involving the whole school.)

1	2	3	4	5	6	7	8	9
not divisible								easily divisible

e. Communicability - relative ease of communicating ideas and/or results of providing French instruction in elementary schools.

1	2	3	4	5	6	7	8	9
not communicable								easily communicable

COMMENTS

V. USE OF TELEVISION AS AN EDUCATIONAL AID

1. a. Did you use television in any other school in which you were a principal?

Yes _____ No _____ Not Applicable _____

b. If Yes, when did you introduce it? 19__.

2. Are you at present using your TV set(s) regularly in the school?

Yes _____ No _____

If Yes, 3. a. How many hours per week is each set used? _____

b. How many classes use each set per week, either individually or as part of a larger group? _____

INTERVIEW SCHEDULE (13)

SCHOOL

4. When did you first use it in this school? 19 .

5. Was television being used in this school when you were appointed?
Yes No

6. Where did the suggestion for using TV in your school first come from?
a. You If so, where did you first year of the practice as applicable to elementary schools?

If No., 7. Have you ever used it? Yes No

If Yes,

8. When did you first introduce it? 19__.
9. When did you discontinue using it? 19__.
10. Please rate the use of TV in terms of the following characteristics.

c. Complexity - the relative difficulty of incorporating telecasts into the regular program.

1 2 3 4 5 6 7 8 9
not very
complex complex

INTERVIEW SCHEDULE (14)

SCHOOL _____

d. Divisibility - the degree to which television may be used on a limited basis. (Not involving the whole school.)

1	2	3	4	5	6	7	8	9
not divisible								easily divisible

e. Communicability - the relative ease of communicating to other principals the ideas and/or results of using telecasts in the elementary school.

1	2	3	4	5	6	7	8	9
not communicable								easily communicable

COMMENTS

APPENDIX D

QUESTIONNAIRE SUBMITTED TO THREE CENTRAL OFFICE OFFICIALS

QUESTIONNAIRE SUBMITTED TO THREE CENTRAL OFFICE OFFICIALS

OPINIONS ON INNOVATIVENESS OF SCHOOLS IN SAMPLE

Consider that you wish to introduce new educational practices (innovations) into the elementary schools of the Edmonton Public School Board. How would you rate the receptiveness to new practices of the forty schools whose names are on the cards? Sort the cards into six piles, considering the principal as being only one of the factors which affect the receptiveness of a school to new practices.

SCORES

Least receptive to change						Most receptive to change					
1	2	3	4	5	6	1	2	3	4	5	6

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